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JOURNAL OF THE AMERICAN PHARMACEUTICAL ASSOCIATION

CONTENTS

Frontispiece and Sketch—E. Fullerton Cook, Ph.M., P.D. 1037
Editorial:
Enhancing the Value of Association Meetings by Contributions Relating to Local Interests and Subjects. 1039
An Exploration in the Interest of Science and Humanity 1040
Associated Endeavors of Pharmacists in Matters of Mutual Concern 1040
The Chemistry of the Heptane Solution—Kremers 1042
Plant Associations—Youngken 1052
American Styrax—Spokes 1055
Studies on the Pharmacology of Digitalis Bodies—Githens 1060
The Detection of Camphor Oil in the Natural Oil of Sassafras—Grant 1065
Experimental Pharmacodynamics for Students of Pharmacy—Bliss, Jr. 1067
Pharmacy and the New Education—Lee 1075
Why Castile Soap Should Be Dropped from the Pharmacopoeia—Kyser 1079
Suggestions to the U. S. P. Revision Committee—Gray 1086
Some Pharmaceutical Preparations—Faser 1088
Surgical Dressings—Hessler 1090
Disinfection Solution (Special Application)—Sayre and Patty 1093
"Honest Advertising Won't Sell Goods"—Kebler 1098
Department of Commercial Interests—Fischelis 1102
Dentifrice Formulas for the National Formulary—Fantus and Snow 1103
Bibliography of Pharmaceutical Research—Arny 1105
Proceedings of the Local Branches 1110
Council Business:
Council Letters 7 and 8 1114
Editorial Notes 1117
Societies and Colleges 1121
The Pharmacist and the Law 1124
Advertising—Cover pages 2, 3 and 4 and pages I–XVIII.

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THE SIXTY-NINTH ANNUAL CONVENTION OF THE AMERICAN PHARMACEUTICAL ASSOCIATION WILL BE HELD IN NEW ORLEANS, LA., SEPTEMBER, 1921

The 1921 meetings of the American Conference of Pharmaceutical Faculties and the National Association of Boards of Pharmacy will also be held in New Orleans during Convention Week

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E. FULLERTON COOK, Ph.M., P.D.

Chairman, Committee of Revision of the United States Pharmacopoeia,
1920–1930

E. FULLERTON COOK

JOURNAL OF THE AMERICAN PHARMACEUTICAL ASSOCIATION

VOL. IX NOVEMBER 1920 NO. 11

E. FULLERTON COOK.

The efficient service rendered by Prof. E. Fullerton Cook in the last two revisions of the United States Pharmacopoeia, as assistant to Chairman Joseph P. Remington, and his thorough acquaintance with the details of revision work, were, no doubt, influential in his election as Chairman of the Committee for the Tenth Revision of the U. S. Pharmacopoeia. An analysis of the previous revisions and presentation of practical suggestions for revising the next edition, in the secretary's report, certified his comprehension of the important matter under consideration. His knowledge of business methods, system in details, capacity for doing and judgment in assigning work, were recognized as leading qualifications for the chairman of this committee. He was assistant to Professor Remington when the latter was chosen for the place made vacant by the passing away of Dr. Charles Rice, and again during the period of the ninth revision, at the close of which Chairman Remington ended his earthly labors. During these years Professor Cook materially assisted in the experimental work for the Pharmacopoeia at the Philadelphia and Longport laboratories. In 1910 he was elected a member of the committee for revising the National Formulary and later appointed on its editing committee.

He has held a number of official positions in the American Pharmaceutical Association and is now the First Vice-President. He was secretary of the Section on Practical Pharmacy and Dispensing 1908–1909; secretary of the Section on Pharmacopoeias and Formularies, 1912–1913, and presided over its deliberations at the following convention; and chairman of the Section on Commercial Interests, 1918–1919. His efforts in securing better recognition for pharmacists in the Government service are well known, and in the conferences with the Surgeon Generals their confidence in him was always evident.

After graduating from the high school of Waynesboro, Pa., Mr. Cook worked in the drug store of Mentzer & Clungston; in 1897 he matriculated at the Philadelphia College of Pharmacy, and secured a position with George M. Beringer, of Camden, N. J. He graduated in 1900, receiving the Operative Pharmacy and Webb prizes. After graduation, he was made Assistant Director of the Operative Pharmacy Laboratories of his Alma Mater, later professor, and was instrumental in developing and greatly extending the courses of this department. He is also Director of the Commercial Course, and was "charge d'affaires" of the intensive course given to the naval students at the College during 1918–19.

Aside from the work on the Pharmacopoeia, Professor Cook assisted in the late revisions of Remington's "Practice of Pharmacy" and the last two editions

of the U. S. Dispensatory, and devised and published a "Simplified System of Bookkeeping for Pharmacists."

The subject of this sketch was born in Lionville, Pa., February 17, 1879, the son of Rev. and Mrs. Herman S. Cook, now of Ambler, Pa. The home of Prof. and Mrs. E. Fullerton Cook is in Swarthmore—one daughter and three sons have added to its beauty and happiness. E. G. E.

SITE FOR THE NATIONAL ACADEMY OF SCIENCES AND THE NATIONAL RESEARCH COUNCIL.

A site for the new building in Washington which is to serve as a home for the National Academy of Sciences and the National Research Council has recently been obtained. It comprises the entire block bounded by B and C Streets and Twenty-first and Twenty-second Streets, Northwest, and faces the Lincoln Memorial in Potomac Park. The Academy and Council have been enabled to secure this admirable site, costing about $200,000, through the generosity of the following friends and supporters: Thomas D. Jones, Harold F. McCormick, Julius Rosenwald, and Charles H. Swift, Chicago; Charles F. Brush, George W. Crile, John L. Severance, and Ambrose Swasey, Cleveland; Edward Dean Adams, Mrs. E. H. Harriman, and the Commonwealth Fund, New York City; George Eastman and Adolph Lomb, Rochester; E. A. Deeds and Charles F. Kettering, Dayton; Henry Ford, Detroit; Arthur H. Fleming, Pasadena; A. W. Mellon, Pittsburgh; Pierre S. duPont, Wilmington; Raphael Pumpelly, Newport; Mr. and Mrs. H. E. Huntington, Los Angeles; Corning Glass Works, Corning, New York. Funds for the erection of the building have been provided by the Carnegie Corporation of New York.

INTERNATIONAL CATALOGUE OF SCIENTIFIC LITERATURE.

An international conference of delegates from important scientific academies to consider the future of the International Catalogue of Scientific Literature has just been held in London at the invitation of the Royal Society. Representatives were present from fourteen countries. The American delegates were Dr. R. M. Yerkes, Professor L. E. Dickson, Professor L. P. Eisenhart, Mr. G. C. Gunnell, and Dr. S. I. Franz, representing the National Academy of Sciences, the National Research Council, and the Smithsonian Institution.

Up to the time of the war, more than thirty countries were joined in undertaking the indexing and publishing the index of the scientific literature of the world. Fourteen annual issues, each of seventeen volumes, have been published covering the literature from 1901 to 1914. The results of the war together with the much-increased cost of printing and publishing have interrupted the undertaking and no index of scientific literature published since 1914 has been issued. The conference decided that even though a change may be made in the future in the method of indexing and of publishing the index, as has often been suggested, it is imperatively necessary to continue the present method until the scientific literature published up to the end of 1915 and possibly also that up to the end of 1920 has been catalogued.

EDITORIAL

E. G. EBERLE, Editor 253 Bourse Bldg., PHILADELPHIA

ENHANCING THE VALUE OF ASSOCIATION MEETINGS BY CONTRIBUTIONS RELATING TO LOCAL INTERESTS AND SUBJECTS.

AFTER the reading of a paper by Charles Mohr on "Vegetation of Louisiana and Adjoining States" before the New Orleans Convention of the American Pharmaceutical Association in 1891, H. M. Whelpley said in substance that if a similar contribution were made each year relating to vegetation of the section in which we met, our volumes would soon become very valuable as a reference on the subjects. The section of the country in which the thirty-ninth annual meeting convened was extremely interesting for most of those in attendance; this is not always the case, but there is some subject local members can present and thereby extend the knowledge concerning it. In one instance it may relate to manufacture, and in another to natural resources, both for the purpose of developing greater possibilities or better understanding.

Of course, Charles Mohr was exceptionally well qualified to write a paper of this kind. Prof. F. Lamson-Scribner said of him: "He has the distinction of having gone from the beaten track of the systematic botanists and considered the plants he studied from an economic aspect. He has not only increased the sum of our knowledge, but has added to our powers of direct usefulness."

The foregoing is quoted because it presents the thought and purpose which prompted this comment, and as a general reference suffice it to say that the author described various phases of the plant world of this section of the country, and directed attention to products of great importance, such as sugar, turpentine, fiber and paper pulp. The readers are, of course, more or less familiar with the blending here of southern and northern vegetation, and, therefore, of the number and varieties of plants considered in this paper, a large part of which was given to the pines, of their educts and products, going somewhat into the details of collection and yield, and also of the sugar cane. Items of lesser importance were the citrus fruits and fiber-producing plants.

The further reasons for the suggestion and comment will become apparent. The statement was brought out in the discussions that loblolly pine was suitable for making paper pulp, as was cotton-wood, and Joseph P. Barnum, member from Louisville, Ky., then interested in the manufacture from the latter source, informed the Association that a young lady, a graduate in pharmacy, had charge of their factory in Louisville. The next point: Mr. Mohr, after hearing the discussions on his paper, said: "I am glad to get information here of which I was entirely ignorant; and, being charged with the duty of bringing before our Govern-

ment all that pertains to the pines for this purpose, I thank you very much for the information received from you."

It will be noted that the contributor, as well as the members, received information. Papers of this kind have value; they interest and profit the members and the section wherein the meeting of the Association is held. "They increase the sum of our knowledge and add to our powers of direct usefulness."

E. G. E.

AN EXPLORATION IN THE INTEREST OF SCIENCE AND HUMANITY.

ALL important explorations have been undertaken either in the interest of science or humanity, but most of the explorers had visions of wealth or greatness. In the exploration to be made under the direction of Dr. H. H. Rusby the leading and directing thoughts are for science, extending or improving our materia medica, and completing botanical investigations and studies begun many years ago. The coöperation of business interests in this compact, actuated by high purposes, is gratifying. The aphorism, "Business is business," is not applicable in this instance; pharmaceutical manufacturers look beyond such application with a wider understanding, a sensitive and seeing mind. They have a wide knowledge of their work, of the trend that leads, and of the ideals that govern and direct those engaged in medicine and pharmacy, and in the service of humanity.

Prior explorations have been made into South America for related purposes, and have each time resulted in finding new sources of supply for drugs, and authoritative standards for others; larger results may be expected from this expedition, organized on a much larger scale. The plans nearing completion contemplate making the exploration also in the interest of biology, and to secure material from which the nature of tropical diseases can be studied; the subject of entomology enters into the study of carriers of infection.

There are many other investigations and studies to be undertaken and an extended account is expected from a contributor who can speak with authority. Pharmacy is represented by those who have given the necessary encouragement for the success of the undertaking, and others who will assist in the investigations to be made after the exploring party returns. E. G. E.

ASSOCIATED ENDEAVORS OF PHARMACISTS IN MATTERS OF MUTUAL CONCERN.

THE U. S. Pharmacopoeia and National Formulary are in daily use in pharmacies, and still there is comparatively little interest displayed by pharmacists in their revisions, now under way. Perhaps the list of deletions from the National Formulary was unnecessarily long. Should preparations be included

which are more or less used, even though the demand is local, the fact should be made known. It is not the purpose of the Committee to make unnecessary deletions, but a study of them indicates that only a few are deserving of a place in the National Formulary.

At the last meeting of the Philadelphia Branch, A. Ph. A. the list was carefully gone over, and less than a dozen proposed deletions were objected to by those present. It was voted, however, to address a communication to all city members, requesting an expression on the deletions, and recommendations for preparations to be included, together with formulas, if they were prepared to submit them. Work along these lines is progressing, and every local association should coöperate in making this standard more useful. Interest among druggists will be aroused by such coöperation and may bring them together for other purposes, if only to fraternize—that is helpful during the period of business adjustment. Recommendations for deletions and additions to the National Formulary may be sent to Chairman W. L. Scoville, P. O. Box 488, Detroit, Mich. What has been said of the National Formulary applies relatively to the U. S. Pharmacopoeia. The Committee of Revision welcomes suggestions.

Whatever will regularly bring a large number of pharmacists together in monthly conferences will prove mutually advantageous. Conforming an excerpt from a paper by H. V. Arny, printed in the October issue of the *American Druggist:* There is need of a deeper realization by pharmacists "that mass action is not confined to text-books on chemistry; that group influence is more potent than unorganized individual effort; that coöperative endeavor brings better results than one-man effort." E. G. E.

REPORT OF THE BOARD OF CANVASSERS OF THE AMERICAN PHARMACEUTICAL ASSOCIATION.

The Board of Canvassers report the following result of the election of American Pharmaceutical Association officers for the year of 1921–1922:

President, Samuel L. Hilton, Washington, D. C.; *First Vice-President,* Charles E. Caspari, St. Louis, Mo.; *Second Vice-President,* David F. Jones, Watertown, S. D.; *Third Vice-President,* Hugo H. Schaefer, New York, N. Y.

Members of the Council: Henry M. Whelpley, St. Louis, Mo.; George M. Beringer, Camden, N. J.; John G. Godding, Boston, Mass.

The vote on Referendum, raising the annual dues to $7.50 per annum, and continuing the JOURNAL and Year Book, carried.

(Signed) ELIE H. LA PIERRE,
CARLTON B. WHEELER,
CHARLES A. STOVER,
IRVING P. GAMMON,
JOHN G. GODDING, *Chairman.*

THE CHEMISTRY OF THE HEPTANE SOLUTION.

BY EDWARD KREMERS.

3. PURIFICATION OF HEPTANE AND ITS PHYSICAL CONSTANTS.

BY D. C. L. SHERK.

Possibly of no hydrocarbon of the methane series have the physical constants been determined with greater satisfaction than those of normal heptane by Thorpe in 1879. The special reasons for this are:

1. The *n*-heptane on which Thorpe made his observations was the product of a plant which apparently does not produce either isomers or homologues of this hydrocarbon.

2. Of the purified material he had a sufficient amount—about seven liters—to make certain of its purity by the constant boiling point of practically the entire amount.

This is in such striking contrast to the materials used in the determination of the physical constants of other hydrocarbons of this series, that it seemed desirable to make doubly certain of the constants recorded by Thorpe. There was all the more reason for this, since Thorpe's material was not completely inactive optically but revealed a slight dextrorotation of 6.9′ in a 200 mm. tube. Thorpe himself is inclined to attribute this deviation to the presence of a "trace" of "terpene;" "although not to a greater extent than 0.5 percent." For this reason a partial reëxamination of the constants was made by Roland E. Kremers in 1915. His material had been purified with fuming sulphuric acid and was totally inactive. However, no matter how carefully purified with sulphuric acid, potassium permanganate solution, and metallic sodium in the order recorded, the product had an odor that was regarded foreign to heptane.

Since then the preliminary work on the chemistry of the heptane solution has suggested several new methods for the purification of the heptane already largely purified by fractional distillation. In order to try out these methods, the fractions obtained by steam distillation of the oil of Jeffrey pine were refractionated with a short column and fraction 96–97° thus obtained was purified with the aid of one of the following chemicals:

1. Iodine.
2. Hydrogen iodide.
3. Hydrogen chloride.
4. Antimony trichloride.
5. Bromine and hydrogen bromide.

It seemed reasonable to expect that a comparison of the physical constants of heptane purified

1, by Thorpe with sulphuric and nitric acids,
2, by R. E. Kremers with sulphuric acid and permanganate solution, and
3, by the chemicals enumerated,

ought to admit of conclusions that might be as near the truth as we may reasonably hope to attain.

I. PURIFICATION OF HEPTANE.

Fractionation of Oil of *Pinus Jeffreyi*.

The material used in these experiments consisted of a ten-gallon lot of heptane, or "Abietene," purchased from Mr. D. F. Fryer of Santa Rosa, California.

It had been shipped in a 10-gallon galvanized iron can and was colorless, or at most slightly milky from what appeared to be suspended water. The odor was pleasantly aromatic and identical with that of *Pinus Jeffreyi* oil distilled in this laboratory from the oleoresin. There was no trace of empyreumatic odor.

First Fractionation.—The heptane was subjected to a preliminary fractionation. For this purpose the oil was divided into four approximately equal parts and each part fractionated in three large fractions as herewith recorded:

No.	1. Cc.	2. Cc.	3. Cc.	4. Cc.
Amount	9500	9500	9500	10200
First fr	1800	1900	2000	2000
Second fr	5600	5950	6000	6000
Third fr	1800	1500	1350	2000
Recovered	9200	9350	9350	10000
Loss	300	150	150	200

The above figures, which are roughly quantitative, reveal a loss of approximately 2 percent. This was due, partly to a defect in the apparatus, partly to a resinous residue left in the still.

Second Fractionation.—The corresponding fractions of each of the four distillations were united and again fractionated serially with steam. This time the distillate was collected in fractions of approximately one liter. After the bulk of the first fraction had been driven over, the middle fraction was added to the residue in the still, and so in turn the third portion. In all 36 liter fractions were obtained; liter fractions 1 to 6, inclusive, were obtained from the first large fraction; liter fractions 7 to 25, inclusive, from the middle portion; and liter fractions 26 to 36, inclusive, from the last portion. Fraction 37 was obtained by cohobating the total aqueous distillate obtained in the fractionation with steam.

The density of the oils was determined at 22° C. by means of a Mohr-Westphal balance. Strict accuracy was attained only to three places. The results are tabulated herewith:

Fraction.	Density 22°.	Fraction.	Density 22°.
1	0.682	19	0.683
2	0.682	20	0.683
3	0.682	21	0.683
4	0.682	22	0.683
5	0.682	23	0.683
6	0.682	24	0.683
7	0.682	25	0.683
8	0.682	26	0.685
9	0.682	27	0.686
10	0.682	28	0.687
11	0.682	29	0.687
12	0.682	30	0.688
13	0.682	31	0.691
14	0.683	32	0.693
15	0.683	33	0.710
16	0.683	34	0.739
17	0.683	35	0.836
18	0.683	36	0.858
		37	.....

The densities here recorded clearly reveal that most of the liter fractions are relatively pure heptane, the density of which, according to Thorpe, is 0.6885 at about 15°, and, according to R. E. Kremers, is 0.6828 at 20°. On the whole, the density is slightly lower than that of the corresponding liter fractions from the oil of *Pinus Sabiniana* obtained by the same operator in 1915.[1] This is possibly due to the fact that the liter fractions in this case represent a second fractionation.

Third Fractionation.—In order to obtain a better insight into the character of the fractions than the densities afforded, three of them, *viz.*, liters 1, 25 and 34, were refractionated.

Liter No. 1.—500 Cc. were fractionated with the aid of a two-bulb fractionating column, an electric hot plate being used to heat. The following fractions were collected and their densities determined:

Fraction.	Boiling point.	Volume. Cc.	Density 24°.
1	−94° C.	a few Cc.	.....
2	94–96	156	0.680
3	96–97	208	0.681
4	97–100	88	0.680
5	Residue	45	0.689
		497	

No positive tests for aldehydes by Schiff's reagent were obtained. The fractions were neutral to litmus. The balance of the first liter was distilled in like manner. It is apparent that even the first liter contains but little material boiling below the boiling point of heptane.

Liter No. 25.—The liter was distilled in two portions as follows:

Fraction.	Boiling point.	Volume. Cc.	Density 23°.
1	−96° C.	...	.....
2	96–97	405	0.680
3	97–100	75	0.682
Residue	above 100	...	.....
		480	

Fraction.	Boiling point.	Volume. Cc.	Density 24°.
1	−96° C.	...	.....
2	96–97	440	0.681
3	97–100	85	0.683
4	above 100	...	.....
		525	

The above data show that this liter consists principally of heptane and but little of any higher boiling substances.

Liter 34.—This liter yielded, as was to be expected, somewhat different results. The results of the first half are herewith recorded:

Fraction.	Boiling point. ° C.	Volume. Cc.	Density.
1	100–112	262	d_{25} 0.688
2	112–130	70	d_{25} 0.710
3	130–150	36	d_{25} 0.753
4	150–168	122	d_{25} 0.834
5	residue	20	d_{15} 0.842
Total		510	

In order to obtain a more correct interpretation of the character of these fractions, the above series was refractionated with the following results:

Fraction.	Boiling point. ° C.	Volume. Cc.	Density.	α_D. Degrees
1	–100	212	d_{25} 0.681	....
2	100–115	108	d_{20} 0.688	....
3	115–145	7	.....	....
4	145–160	45	d_{15} 0.816	—12
5	160–168	90	d_{15} 0.850	—14
6	residue	40	d_{15} 0.887	—12

The higher fractions absorbed bromine violently. Not very much gas was given off by the addition of sodium. Hence it becomes apparent that one of the highest liter fractions contained traces of terpenes. The second half of fraction 34 was distilled in like manner. As before, the first fractionation gave a large fraction 100–115°; a smaller one 115–145°. Refractionated, the final fractions are as follows:

No.	Boiling point. ° C.	Volume. Cc.
1	96–100	225
2	100–115	96
3	115–145	20
4	residue	200
		540

With the above data as a means of interpreting, in a general way, the character of the liter fractions, all of them were refractionated. Up to liter 12 inclusive no special record was kept. After that it seemed worth while to record the results of the fractionations. As a rule, two of the liter fraction bottles were fractionated in three portions. For the most part the two liter fractions resolved themselves into the four fractions tabulated herewith. In each fractionation the temperature was raised to 115°. At the end the residue in the still boiling above 115° was fractionated and recorded at the bottom of the first column.

		Temperature Range.				
Lit.	Amt. used. Cc.	–96°. Cc.	96–97°. Cc.	97–100°. Cc.	100–115°. Cc.	Amt. recd. Cc.
13 and 14	700	4	610	65	0	679
	700	55	600	86	11	752
	718	10	585	107	10	712
15 and 16	700	0	584	101	16	701
	700	5	570	112	6	698
	690	0	560	117	10 sl. loss	687
17 and 18	700	10	568	113	10	701
	700	6	578	95	20	699
	790	0	665	104	18	787
19 and 20	700	0	535	140	20	695
	700	0	510	160	18	688
	730	17	565	123	25	730
21 and 22	700	5	542	120	26	693
	700	32	523	110	25	690
	750	0	605	120	30	755

Lit.	Amt. used. Cc.	–96°. Cc.	96–97°. Cc.	97–100°. Cc.	100–115°. Cc.	Amt. recd. Cc.
23 and 24.....	700	6	525	138	30	698
	700	38	486	127	37	688
	730	10	525	144	45	724
25 and 26.....	700	5	410	208	70	693
	700	5	280	350	105	750
	800	2	90	585	105	782
27 and 28.....	700	..	10	500	165	675
	700	5	5	480	207	697
	730	..	...	490	220	710
29 and 30.....	700	..	...	370	270	640
	700	..	...	365	310	675
	712	..	10	335	355	700
31 and 32.....	700	..	...	195	470	665
	700	..	...	145	492	637
	610	..	...	25	515	...

115–145°—85 Cc.
145–(200)°—120 Cc. The temperature stood at 162° for the major portion.

CHEMICAL PURIFICATION OF HEPTANE FRACTION.

The well-established method of purifying hydrocarbon mixtures of the paraffin series consists of the treatment with sulphuric acid or with a mixture of sulphuric and nitric acids. This is the method employed by Thorpe.[2] It was originally supposed that these hydrocarbons were not acted upon by these reagents that proved so successful in attacking hydrocarbons of the benzene series; hence the designation paraffins. However, it was shown by Worstall[3] that these hydrocarbons are not altogether indifferent to the action of these reagents in their concentrated form. Hence, while the treatment with fuming sulphuric acid may serve a very useful purpose, even in quantitative work when applied to the assay of petroleum hydrocarbons in turpentine oil, it does not follow that the product thus treated is sufficiently pure for the most exact determination of physical constants. That the heptane from Digger's pine oil, treated with concentrated sulphuric and nitric acids by Thorpe, was not even altogether free from terpenes is revealed by the slight optical activity of his purified hydrocarbon and is candidly admitted by this careful investigator. Gruse,[4] who purified heptane with which a large amount of terpenes had been admixed, used fuming sulphuric acid and thus obtained a product that was optically inactive in a 200 mm. tube. Heptane from Jeffrey pine purified with sulphuric acid and subsequently treated with permanganate and metallic sodium by R. E. Kremers[1] was likewise inactive. Digger's pine heptane had previously been treated in like manner by Wm. Rabak.[1] These highly purified products, however, had a distinct spicy odor apparently not due to heptane. Whether the substance or substances to which this odor is due are formed by the sulphuric acid employed or by the subsequent treatment with permanganate is of little consequence. So long as their presence is perceptible, attempts to purify heptane by reagents that would either not form them or at least remove them seemed desirable. The opportunity to obtain a hydrocarbon of the methane series in a high degree of purity seemed too good to be ignored.

The preliminary survey of the chemistry of the heptane solution made during the academic year 1916–17 had suggested at least these methods of purification, *viz:*

1. With iodine.
2. With hydrogen iodide.
3. With hydrogen chloride.
4. With antimony trichloride.
5. With bromine and hydrogen bromide.

These were tried out with liter quantities of fraction 96–97° as described below.

1. *Purification with Iodine.*—10 Gm. of powdered iodine were shaken with a liter of heptane and exposed to the sun until the deposition on the inside of the bottle prevented the penetration of light. The solution was filtered into another bottle and again exposed to sunlight. This operation was repeated until no further deposit was formed. The final filtrate was shaken with metallic mercury to remove the iodine and the heptane again filtered. To this filtrate a considerable quantity of sodium was added and the contents of the bottle shaken repeatedly for a week. The sodium was but slightly attacked.

The heptane thus purified was fractionated in two approximately equal portions, the distillate in each case being collected in 50 Cc. fractions with the results herewith tabulated:

Fractions. No.	Total distillate.	Fractionation. I. Degrees.	Fractionation. II. Degrees.
1	1st drop	96.2	95.9
	5 Cc.	96.70	96.55
	10 Cc.	96.90	96.70
	25 Cc.	97.10	96.89
	50 Cc.	97.16	96.97
2	100 Cc.	97.22	97.02
3	150 Cc.	97.27	97.07
4	200 Cc.	97.29	97.16
5	250 Cc.	97.31	97.18
6	300 Cc.	97.34	97.19
7	350 Cc.	97.38	97.26
8	400 Cc.	97.40	97.30
9	450 Cc.	97.43	97.31
10	500 Cc.	97.46	97.54
	520 Cc.	.....	98.60
11	550 Cc.	97.61	.....
12	571 Cc.	98.05	.....

Fraction 12 of the first fractionation revealed traces of iodine. In both fractionations fractions 2 to 10, inclusive, came over within a few tenths of a degree, thus revealing a remarkable degree of purity for so large an amount as 450 Cc. in each case. Hence these fractions were bulked and considered as a unit.

2. *Purification with Hydrogen Iodide.*—As a means of purification and to obtain a solution for preliminary work, heptane was saturated with hydrogen iodide gas generated in the usual way from iodine and phosphorus. Because of vapors carried over and decomposition, iodine became mixed with the solution. This iodine—hydrogen iodide solution remained for several weeks during which time portions were used for other experimental work, but no such recovered heptane was returned to this portion and is not represented here. After washing with alkali and drying over sodium, fractionation with a column and collection of the distillate in equal fractions gave the following table:

	I.		II.	
No.	Total distillate.	T. Degrees.	Total distillate.	T. Degrees.
1	1st drop	95.90	1st drop	95.7
	25 Cc.	96.70	25 Cc.	96.73
	.....	.....	50 Cc.	96.82
2	75 Cc.	96.80	100 Cc.	96.91
3	125 Cc.	96.87	150 Cc.	96.98
4	175 Cc.	96.90	200 Cc.	97.00
5	225 Cc.	96.93	250 Cc.	97.02
6	275 Cc.	96.98	300 Cc.	97.02
7	325 Cc.	97.00	350 Cc.	97.08
8	375 Cc.	97.04	400 Cc.	97.11
9	425 Cc.	97.06	450 Cc.	97.13
10	475 Cc.	97.09	500 Cc.	97.16
11	525 Cc.	97.10	550 Cc.	97.20
12	575 Cc.	97.11	600 Cc.	97.30
13	625 Cc.	97.20	650 Cc.	97.70
14	675 Cc.	97.32	700 Cc.	100.8
15	725 Cc.	98.10	.....	.....
16	747 Cc.	100.5	.....	.....

Fractions 3 and 4 of I were redistilled as part of II. At the end of Series I iodine appeared in the distillate. The residue had a blue color which appeared in the residual liquid also. Slight overheating of this residue in the sand bath gave a white color. The flask distilled entirely dry.

In Series I fractions 5 to 13, inclusive, were mixed, and in Series II fractions 2 to 11, inclusive, were mixed and the entire amount distilled rather more slowly on the intermediate heat with the flask and part of the projecting thermometer surrounded closely by asbestos paper. This gave 900 Cc. with a boiling range of 0.30°. The condenser was steamed out with heptane vapor before this run.

		Fractionation.	
No.	Total distillate.	I. Degrees.	II. Degrees.
1	1st drop	96.05	96.25
	10 Cc.	96.54	96.70
	25 Cc.	96.68	96.80
	50 Cc.	96.77	96.90
2	100 Cc.	96.82	96.91
3	150 Cc.	96.87	96.98
4	200 Cc.	96.89	97.00
5	250 Cc.	96.89	97.02
6	300 Cc.	96.85	97.03
7	350 Cc.	96.89	97.06
8	400 Cc.	96.90	97.09
9	450 Cc.	96.95	97.10
10	500 Cc.	97.01	97.13
	535 Cc.	.....	97.20
11	550 Cc.	97.32	.....
	585 Cc.	.....	98.70
12	590 Cc.	100.	.....
	615 Cc.	.....	98.80
13	635 Cc.	.....	101.7

In Series I, fractions 4 to 10, inclusive, were combined and in Series II, fractions 3 to 10, inclusive. These portions came over within 0.23°, respectively. The hot flask showed no liquid residue, only a few slight rings of discoloration.

3. *Purification with Hydrogen Chloride.*—Dry hydrogen chloride was passed into the heptane kept cold by means of ice water. The stopper of the bottle having been tied down, the saturated solution was allowed to stand for a week or more. The heptane solution was then poured off the resinous deposit which had been formed; washed with water and dried with sodium wire. As in the previous experiment, the heptane thus purified was subjected to fractionation in approximately equal portions and the distillate collected in 50 Cc. fractions as herewith recorded:

		Fractionation.		
		I.		II.
No.	Total distillate.	Degrees.		Degrees.
1	1st drop	95.80		95.50
	5 Cc.	96.30		96.30
	10 Cc.	96.48		96.45
	25 Cc.	96.66		96.68
	50 Cc.	96.76		96.80
2	100 Cc.	96.82		96.90
3	150 Cc.	96.90		96.92
4	200 Cc.	96.91		96.95
5	250 Cc.	96.94		96.98
6	300 Cc.	96.99		97.00
7	350 Cc.	97.01		97.02
8	400 Cc.	97.05		97.10
9	450 Cc.	97.09		97.30
10	500 Cc.	97.30		98.30
11	550 Cc.	100.90	517 Cc.	101.70

Fractions 2 to 9, inclusive, of both series came over within 0.3° and 0.4°, respectively. Although the range of boiling temperature for each 400 Cc. is less than one-half degree, it is not quite as narrow as that of the heptane purified by means of iodine.

A second lot of heptane was saturated with dry hydrogen chloride for the purpose of solubility and other experimental work. This stood from December 3 to January 24. What remained was washed with water and dried over sodium for days and finally distilled over a little sodium and the best fractions combined.

No.	Total Distillate.	I. Distilled 1/24. Degrees.	II. Distilled 1/25. Degrees.	III. Distilled 1/25. Degrees.
1	1st drop	95.60	95.60	95.80
	25 Cc.	.....	96.42	96.54
	50 Cc.	96.25	96.51	96.60
2	100 Cc.	96.34	96.59	96.70
3	150 Cc.	96.40	96.65	96.72
4	200 Cc.	96.44	96.69	96.78
5	250 Cc.	96.49	96.71	96.80
6	300 Cc.	96.52	96.74	96.84
7	350 Cc.	96.57	96.80	96.90
8	400 Cc.	96.59	96.80	96.90
9	450 Cc.	96.60	96.83	97.00
10	500 Cc.	96.63	96.90	97.20
11	550 Cc.	96.70	96.94	98.25
12	600 Cc.	97.00	97.01	.....
	620 Cc.	.....	.....	101.50
13	650 Cc.	98.60	97.00	.....
14	.....	.....	101.90 (dry)	.....

In Series I fractions 3 to 10, inclusive, in Series II fractions 3 to 11, inclusive, and in Series III fractions 3 to 9, inclusive, were all combined and refractionated. The temperature range in the three series was 0.36°, 0.42° and 0.40° giving, respectively, 450 Cc., 500 Cc., and 400 Cc. of distillate.

		Fractionation.	
No.	Total distillate.	I. Degrees.	II. Degrees.
1	1st drop	95.70	96.60
	10 Cc.	96.87	97.00
	25 Cc.	97.10	97.20
	50 Cc.	97.20	97.22
2	100 Cc.	97.25	97.29
3	150 Cc.	97.30	97.30
4	200 Cc.	97.30	97.32
5	250 Cc.	97.30	97.38
6	300 Cc.	97.32	97.39
7	350 Cc.	97.37	97.40
8	400 Cc.	97.38	97.40
9	450 Cc.	97.40	97.50
10	500 Cc.	97.40	97.65
	525 Cc.	.....	97.85
11	550 Cc.	97.40	.....
	585 Cc.	.....	100.90
12	600 Cc.	97.40	.....
13	650 Cc.	97.40	.....
14	700 Cc.	97.44	.....
15	750 Cc.	97.52	.....
16	800 Cc.	98.70	.....

The flask contained no residue except a stain on the walls, the odor of which was slightly resinous. The last fractions of the distillate had an odor of kerosene.

For the purpose of still more accurate boiling-point determinations and ascertaining the values of the other physical constants in Series I, fractions 3 to 14, inclusive, and in Series II, fractions 3 to 9, inclusive, were combined, giving temperature ranges of 0.19° and 0.21° and distillates of 550 and 300 Cc., respectively.

4. *Purification with Antimony Trichloride.*—For this purpose a liter of heptane was shaken repeatedly with 15 Gm. of antimony chloride for a period of more than eight days. A reddish, sticky deposit was formed on the crystals of antimony chloride and was given off to the walls of the bottle during shaking so that fresh surfaces of the antimony chloride were exposed to the slight impurities in the heptane. In order to remove the antimony chloride in solution, the heptane was shaken with water; the mixture filtered; the heptane dried with sodium wire, and finally fractionated as in the earlier purification.

		Fractionation.	
No.	Total distillate.	I. Degrees.	II. Degrees.
1	1st drop	95.50	95.40
	5 Cc.	96.25	96.30
	10 Cc.	96.45	96.45
	25 Cc.	96.65	96.65
	50 Cc.	96.78	96.80
2	100 Cc.	96.84	96.89
3	150 Cc.	96.89	96.91
4	200 Cc.	96.91	96.93
5	250 Cc.	96.94	96.97

6	300 Cc.	96.97	96.99
7	350 Cc.	97.00	97.00
8	400 Cc.	97.02	97.06
9	450 Cc.	97.07	97.27
10	500 Cc.	97.24	100.50
11	550 Cc.	98.75	.....

Again the bulk of the heptane, *viz.*, fractions 2 to 9, inclusive, distilled over within narrow limits, namely 0.3°.

5. *Purification with Bromine and Hydrogen Bromide.*—That portion of heptane recovered from the action of bromine and also that which had been treated with hydrogen bromide, was combined and washed with water and dilute alkali and allowed to stand over calcium chloride. This was fractionated allowing the high boiling residue to remain in the flask until the entire quantity had been fractionated.

		Fractionation.		
No.	Total distillate.	I. Degrees.	II. Degrees.	III. Degrees.
1	1st drop	95.90	97.10	98.00
	10 Cc.	97.15	97.50	.....
	25 Cc.	97.45	97.85	98.35
	50 Cc.	97.60	98.20	98.50
2	100 Cc	97.80	98.40	98.70
3	150 Cc.	98.00	98.55	98.85
4	200 Cc.	98.10	98.72	98.90
5	250 Cc.	98.20	98.95	99.00
6	300 Cc.	98.45	99.20	99.20
7	350 Cc.	98.65	99.50	99.40
8	400 Cc.	98.90	99.90	99.70
9	450 Cc.	99.20	100.50	.....
10	500 Cc.	99.90	101.35	.....
11	550 Cc.	100.65	102.40	100.70
12	600 Cc.	102.15	105.00	101.40
13	650 Cc.	.....	.....	102.20
14	700 Cc.	.....	.....	103.40
15	750 Cc.	.....	.....	104.00
16	800 Cc.	.....	.....	105.50
17	830 Cc.	.....	.....	.....
18	876 Cc.	.....	.....	160–205

The fractions obtained by this distillation were treated for five days with sodium wire. This removed the remaining moisture and perhaps some bromine derivative. The remaining heptane was again fractionated and collected within narrower limits of temperature.

		Fractionation.			
No.	Total distillate.	I. Degrees.	II. Degrees.	III. Degrees.	IV. Degrees.
1	1st drop	95.90	96.40	96.00	96.40
	10 Cc.	96.40	.....	.....	.....
	25 Cc.	96.60	96.80	96.80	.....
	50 Cc.	96.72	96.88	97.00	.....
	70 Cc.	.....	.....	.....	97.03
2	100 Cc.	96.83	97.12	97.20	97.20
3	150 Cc.	96.89	97.25	97.31	97.36
4	200 Cc.	96.92	97.32	97.40	97.44
5	250 Cc.	96.98	97.40	97.47	97.50
6	300 Cc.	97.04	97.47	97.56	97.60

No.	Total distillate.	Fractionation. I. Degrees.	II. Degrees.	III. Degrees.	IV. Degrees.
7	350 Cc.	97.13	97.60	97.70	97.70
8	400 Cc.	97.20	97.75	97.83	97.80
9	450 Cc.	97.30	97.90	98.00	97.94
10	500 Cc.	97.42	98.10	98.20	98.02
11	550 Cc.	97.62	98.32	98.55	98.30
12	600 Cc.	97.90	98.85	.....	99.40
13	650 Cc.	99.00	99.00	.....	100.50
	670 Cc.	.....	103.80	.....	.....
14	700 Cc.	101.90	.....	.....	102.90
15	720 Cc.	102.40	.....	.....	.....
	740 Cc.	.....	.....	.....	104.00

This product was not of the high degree of purity of the preceding fractionations because it was mixed with bromine substitution products which were not entirely removed by the two treatments with sodium and fractionation. The distillate had a sweet odor resembling the lower alkyl halides and entirely different from that of the heptane purified by the other methods. Those fractions within one degree were combined and this sample then reserved for photo-experiments. Further determinations of physical constants were made more for the sake of comparison than in the hope that it would have the high degree of purity of the other samples.

(*Continued in December Number.*)

*Editor's Note:—The bibliography, references to which are made in this part, will be printed at the conclusion of this contribution, December issue.

PLANT ASSOCIATIONS.*

BY HEBER W. YOUNGKEN.

Alike with humans and other animals, plants have developed, during the ages, definite habitat relations with their surroundings.

If we look about in nature we invariably find certain definite species of plants growing in the same locality, in the same kind of soil and subject to the same climatic conditions as other species with which they are associated. Thus, we are accustomed to find American hellebore growing in moist low areas of woodlands or meadows alongside of skunk cabbage; sphagnum, with drosera; the pitcher plants, cranberries and bladderworts in bogs; scrub oaks, beeches, maples, sour gums, bracken, holly, etc., in pine barrens; the splatterdocks, pondweeds, waterlilies and water-hyacinths in ponds; cacti and century plants in sandy, hot, desert regions. In each of these instances we recognize a distinct group of plants. This, then, in its entirety, occurring in a common locality, is what is recognized as a plant association.

Plant associations have been grouped in a number of ways depending either upon the relation they have assumed to various factors of environment such as light, temperature, water, other plants and animals or upon the principle of succession. There are advantages to be had in each method of grouping. In this brief exposition, however, they will be classified solely on the basis of their relation to water.

*Read before Scientific Section, A. Ph. A., City of Washington meeting, 1920.

According, therefore, to the relation plant associations have assumed in regard to water, they may be grouped as follows:

1. Hydrophytes or water plants.
2. Helophytes or marsh plants.
3. Halophytes or salt plants.
4. Xerophytes or desert plants.
5. Mesophytes or intermediate plants.
6. Tropophytes or alternate plants.

HYDROPHYTES.—The effect of aquatic environment on the structure of water plants is most striking. The root systems are reduced in size, the root hairs of those immersed in the water being absent. The supportive action of the water is such that the fibrovascular elements of the stems, which usually function both for support and conduction of crude sap, are greatly reduced in size and strength. The leaves, stems and roots possess large air spaces. The mesophyll of the leaves is spongy and the chloroplasts motile. Stomata are entirely absent from leaves that are submerged and only present on the upper surface of floating ones. Some of these plants have broad, floating leaves and dissected submerged ones, often with thread-like divisions. The submerged parts are devoid of special protective walls, *e. g.*, those containing cutin of suberin. The free-floating microscopic plants, blue-green algae, bacteria, diatoms, desmids, etc., form the plankton of our ponds, rivers and lakes. The free-swimming higher plants (the pleuston) comprise certain liverworts like riccia, water ferns, and such seed plants as water-lettuce and water-hyacinth. The aquatic plants include the algae, mosses and flowering plants, which, attached to rocks, comprise the lithophilous benthos. Another class of aquatic plants (benthos) include those with true roots, which attach the plant to the substratum, and at most possess floating leaves. This type includes the water-lilies, the water-chestnut, the splatterdocks, the floating-heart and the pondweeds.

HELOPHYTES.—To this group belong plants typical to marshes. A marsh is an area with wet soil, wholly or partially covered with water and with annual or perennial herbs (never shrubs and trees) which are adjusted structurally to a mucky soil, lacking the usual supplies of oxygen. These plants likewise show an adjustment to a partial or periodical submergence. Like hydrophytes, marsh plants are for the most part perennial. They produce adventitious roots and possess horizontal rhizomes, or runners, and frequently have air chambers in roots, stems, and leaves, so that they are adapted to meet the scarcity of air in wet soils. They also show a striking development of erect chlorophyll-bearing organs in the shape of leaves, in the flags, and stems, in the rushes. The taller seed-like plants of the marsh-land such as seed-grass (*Phragmites*), the bur-seed (*Sparganium*), the cat-tails (*Typha*), the blue flags (*Iris*), the sweet flag (*Acorus calamus*) and the papyrus (*Papyrus*) form associations known as fresh-water marshes, reed-marshes or fens. The channels or pools of water in among these amphibious plants are filled with true aquatic plants.

HALOPHYTES.—The plants of this group live in soil which is rich in soluble salt, usually common salt (NaCl), and on account of the fact that the osmotic force of the root is nearly inadequate to overcome that of the concentrated solution of the soil, the soil to such plants is physiologically dry. In fact, a halo-

phyte is one form of xerophyte. The most striking feature among halophytes is that they are nearly all succulent plants. The leaves of such plants, for example, are thick, fleshy and more or less translucent. They are rich in concentrated cell sap by which they are able to counteract the osmotic pull of the concentrated saline solution of the soils in which they live. Anatomically they are poor in chlorophyll, the intercellular-air-spaces are small and the palisade tissue is more abundant. Coatings of wax are found and a hairy covering, although infrequent, sometimes occurs. Coriaceous and glossy leaves, especially in tropical halophytes, are noteworthy, while in many salt-loving plants the stomata are sunken. Halophytes are found in the coastal salt marshes and on saline tidal flats in temperate and tropical countries and on alkali flats of interior continents. Notable examples of these plants are the salt marsh samphire, *Salicorna ambigua*, the mangroves (*Rhizopora*) and the bald cypress (*Taxodium*).

XEROPHYTES.—The plants of this group, like the halophytes, are adjusted to live in a soil which is physiologically dry. The soil may owe this condition to its physical nature, such as porosity (sand), or to the presence of humic acids, or by chemical action, which inhibits the absorption of water. They are adapted to meet the conditions of strongest transpiration and most precarious water supply. To meet such conditions of physiological drought, the plants show various structural adaptations. In deserts, where the atmospheric precipitations are less than a certain limit, the plants acquire a xerophytic structure such as succulency, water storage tissue, associated frequently with mucilage, lignified tissue, thick cuticle of the leaves, depressed stomata (frequently in pits), reduced transpiration surfaces and thorns. Cacti and century plants (*Agave*) are types of xerophytes, while many bog plants with leathery leaves are xerophytic.

MESOPHYTES.—These are plants that grow in soil of an intermediate character which is neither specially acid, cold or saline, but is sufficiently well supplied with water and rich in the elements required for plant growth. Plants which grow under such conditions do not have structures by which transpiration is closely controlled. They have large leaves, frequently toothed and incised, with numerous stomata, usually on the lower surface and small intercellular-air-spaces. The leaves and stems are usually of a fresh green color. Typical of the mesophytes are the grasses and most of the annual and biennial herbs of the temperate regions.

TROPOPHYTES.—This term was introduced by Schimper in 1898 for land plants which have deciduous leaves and whose conditions of life are, according to the season of the year, alternately those of mesophytes and xerophytes. The mesophytic condition is found in summer, when the shrubs and perennial herbs, included in this group, are in full leafage, and when, owing to the regular supply of rain during the growing season, the soil is plentifully supplied with water to meet the demands during the period of active transpiration of these plants. During the winter they are xerophytes. The cold of the winter freezes the water in the soil so that the transpiration is reduced to a minimum, and this is associated with the fall of the leaves of the trees and shrubs and the death of the overground portion of the perennial herbs, which spring up each year from their underground parts. The vegetation of cold temperate regions is mainly tropophytic. The deciduous trees and shrubs, also known as the broad-leaved plants and summer-

green plants, form the principal tropophytes. The deciduous forests, which include the oaks, the beeches, the ashes, the maples, the walnuts, the chestnuts, cover a great part of eastern and western China, central Europe (England, France, Belgium, Germany) and eastern Australia, and are coincident with countries occupied by most civilized races of man, such as the Americans, Europeans, Chinese and Japanese. The cold temperate climatic conditions which have determined the distribution of the forest trees have been influential also in the development of the energetic races of mankind.

AMERICAN STYRAX.*

BY RAY E. SPOKES.

The name styrax is applied to an exudation obtained from several species of Liquidambar, belonging to the family of Styraceae, and growing in tropical and subtropical countries. There are two commercial varieties, one known as Levant styrax, and the other known as American styrax, or sweet gum, obtained from *Liquidambar styraciflua*. Styrax is official in nearly all the pharmacopoeias, and the tests and standards refer solely to the Levant variety, or balsam of European origin.

The balsam was discovered soon after the discovery of America, and, soon after the first settlement, vast shipments were sent from Mexico to Spain and other European countries, where it was used in medicines, ointments, incense, and perfumery. Shortly before the world war, the amount of material exported to the United States was limited, and interest was aroused in the American styrax, in order to meet the demands. This had been used for years by the aborigines in the western hemisphere, even prior to the discovery of America; the early settlers appreciated its value and considered it one of the great discoveries along with tobacco, cinchona, etc. As there was thought to be some difference in composition between the Levant and the American variety the shipments fell off; there continued a local use, however, not only by people of Central America and northern parts of South America, but by people of this country.

During 1918 Levant styrax was not obtainable; in 1916–1917, styrax was quoted at $6.00 to $7.00 per pound. It is said that American styrax can be gathered and sold, at a profit, at $1.50 a pound.[1] Owing to the limited supply of the European article, even at the present time, the American species must be recognized, and for this reason has received some attention of late. It is now extensively used in perfumery, for incense, and in tobacco. Many of the analyses have been made from the exudations of South American trees; the material for this study was collected from trees growing in the vicinity of Atlanta. The South American product is semi-liquid; the product obtained from southern United States is of a firmer consistency, resembling the European styrax.

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* The writer is indebted to Dr. Henry Kraemer, who has been deeply interested in the development of American styrax, and who assisted in obtaining the various samples.

[1] H. Kraemer, *Am. J. Pharm.*, 1918, 404.

Hanbury[1] states that a conventional distinction of confining the name styrax to the liquid drug and storax to the solid drug is adopted by some authors. Throughout this paper, the name styrax refers to the semi-liquid drug, unless otherwise noted. "Storax" is the English equivalent of the original Greek word. Tschirch[2] has worked out (1901) the chemical constituents of American styrax in a very interesting way, along lines similar to those followed by von Miller in his work on styrax. At that time the museum of the Pharmaceutical Society of Great Britain and the pharmacognosy collection of Berne possessed no authentic samples of American styrax. Tschirch, working on styrax from Mobile, Ala., and von Miller, working on styrax from Statesville, N. C., have isolated the following constituents: Styrol, free cinnamic acid, styracin, cinnamic acid-phenyl-propyl ester, vanillin, and styresinol, both free and as the cinnamic acid ester. Tschirch states that the ethyl ester of cinnamic acid exists only in the Levant species, but this may be due to some change in the method of collection. The first work attempted on the American variety, previous to this time, is found in the *Journal de Pharmacie* for June 1831. In that article, M. Bonastre furnished a description of a styrax product from America, and also gave some account of its constituents. Its acid, previous to this time, was thought to be benzoic, and it was only after Liebig detected cinnamic acid in Peru and Tolu balsams, that he suspected its presence in styrax. About this time M. Plantemeur and Fremy contributed some information of a general nature relative to the gum.

The valuation of styrax is rendered rather difficult, because the true composition of the constituents of the gum as they normally occur is not fully known; when this is determined, more frequent and successful use will be made. The quality of styrax has deteriorated markedly in the last few years. Requirements of the various pharmacopoeias have been compared, and it appears that the acid and saponification numbers are not sufficient criterions of quality. Since the consumption of a strictly U. S. P. product is comparatively small, interest in having the acid number changed in the pharmacopoeias, so that the American styrax may be included, is more academic than commercial, the bulk being used, as heretofore mentioned, for technical purposes.

It appears that the cinnamic acid content does not add or detract from the therapeutic value, as the presence of the acid may indicate an ester decomposition, and one might assume that the lower the cinnamic acid content, existing as true acid, the higher the percent of aromatic constituents. The samples used were of average quality, some were lighter and less firm than others, but all softened in the hand, became elastic, and melted to a clear, yellow fluid at 50°. It will be noted that the saponification number ran just within the U. S. P. requirements, about constant at 170°. The total cinnamic acid content was determined by the bromine absorption method which after trying several methods is, in the writer's opinion, the best and most accurate. This method was first suggested by Lemke and von Itallie,[3] and depends upon the following reactions:

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[1] Hanbury, "Science Papers."

[2] Tschirch and von Itallie, *Arch. der Pharm.* 238 532, 1901.

[3] Schweiz: *Apoth.-Ztg.* 1918, 286.

$$3C_6H_5CH:CH.COOH + KBrO_3 + 5KBr + 3H_2SO_4 = C_6H_5CHBr.CHBrCOOH + K_2SO_4 + H_2O.$$

$$KBrO_3 + 5KBr + 3H_2SO_4 = 3H_2SO_4 + 6Br + 3H_2O.$$

$$1Na_2S_2O_3 = 1\,I = 1Br \begin{cases} \xrightarrow{\frac{KBrO_3}{6}} \\ \xrightarrow{\frac{C_6H_5CH:CH.COOH}{2}} \end{cases}$$

1 Cc. $\frac{N}{10}$ thiosulphate, or 1 Cc. $\frac{N}{10}$ bromate = 0.0074 Gm. cinnamic acid.

The details for carrying out this method are to be found in the reference below. The U. S. P. method, in which the weighed sample is shaken out for a period of two hours with petroleum benzin-alcohol-potash mixture and then titrated, does not appear to be adequate. The bromine method gives very constant results, although a method as outlined by C. A. Hill and T. T. Cocking is equally as good.[1] All my samples were strained:

	(a). %	(b). %	(c). %	U. S. P. Standard.
Incineration residue	1.4	1.4	1.4	not more than 1%
Acid value	35	39	37	not more than 86 not less than 56
Undissolved residue	3.0	3.5	3.6	not more than 2.5%
Cinnamic acid (free)	12.07	13.84	13.75	*Saponification value*
Resin esters	34.1	35.5	.....	not more than 230
Styrol	1.1	1.6	.....	not less than 170

In estimating the esters in American styrax, results seem to vary as much as four percent, when analyzing aliquot portions of the same sample, under slightly varying conditions. Like results were obtained in determining the composition of formates and acetates by A. Behal.[2] It is altogether possible that, under a reflux condenser, the esters of styrax in the presence of alcoholic potash are decomposed with the result that a certain amount of the esters of an alcohol of lower molecular weight and also an alcohol of higher molecular weight is split off. Behal points out that in heating benzoates of phenol, p-chlorphenol, eugenol, etc., with semi-normal alcoholic potash solution a certain amount of ethyl benzoate forms which is sweet-smelling in contrast to the benzyl benzoate that has but little odor. Results similar to these occur with cinnamyl cinnamate; the reaction becomes more pronounced when a large amount of alcoholic potash is used. I determined the acid content in as many as fifteen samples of American styrax by placing them in a 125 Cc. combustion bottle in an autoclave, and hydrolyzing them for a period of two hours at 50 pounds' pressure. The results, although running from one to two percent higher than in instances where reflux condensers were used, were entirely satisfactory and the method is to be recommended. Nievierre points out that heating under pressure gives high results not due to any possible action of the alkali on the ester, but probably to the influence of such other bodies as aldehydes. Tschirch and von Itallie have isolated an aldehyde from American styrax in a rather impure state, and have identified it as vanillin. This body

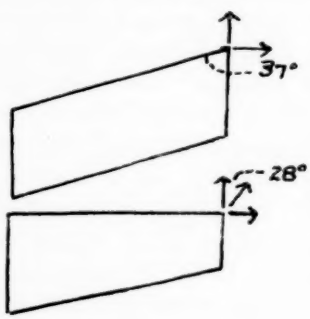
[1] Schimmel and Co. Report for 1912.

[2] *Bull. Soc. Chim.*, 1914, 565.

gave with phloroglycin hydrochloride the characteristic vanillin reaction, and with hydrochloric acid and pyrogallol the blue-violet reaction.

After the removal of sodium cinnamate by steam distillation of styrax and the subsequent treatment with caustic soda, the resinous mass contains styracin, or cinnamyl cinnamate. I obtained this by dissolving the resinous mass mentioned above in twenty parts of boiling alcohol, filtering, and recovering about two-thirds of the alcohol used by distillation. After cooling the residue, the styracin precipitates in a more or less impure state, and is very often gummy. To purify, the mass was washed with cold alcohol, and recrystallized from ether, when it formed pure white needle-shaped crystals, m. pt. 38°. It is distinguished from cinnamic acid by its action toward sodium hydroxide, its easy crystallization, and by the formation of the dibromide $C_6H_5CH:CHCO_2CH_2CHBr$, by brominating the ether solution of styracin until it is no longer decolorized. The white powder is then washed with ether, and recrystallized from hot alcohol.

If styracin be distilled with strong caustic soda solution, cinnamic alcohol passes over, leaving in the retort basic cinnamate of soda, which yields upon treatment with HCl, rhomboidal prisms of cinnamic acid. I have found additional help in the differentiation between styracin and cinnamic acid in the observation of their respective sublimates. Wherry[1] has published an article showing the application of the optical methods to the identification of organic compounds. Sublimates of both styracin and cinnamic acid were obtained according to the method of Tunmann in subliming similar organic compounds. The material is placed on an asbestos slab, first being placed upon a small piece of a recipient. At a distance of two or three centimeters from the asbestos slab is a wooden stick, 3–4 mm. high and 6–8 mm. long. A recipient for the sublimate is placed over the sublimate in such a way that one end rests upon the asbestos slab, and the other upon the wooden stick, care being taken that the recipient does not touch the lower piece of glass. Styracin does not sublime as readily as the cinnamic acid, the latter readily separates out in large rapidly growing crystals. Tunmann has found that silver nitrate dissolves the cinnamic acid crystals and causes them to lose their magnificent colors under polarized light.



Cinnamic Acid	Character mineral	+
	Character zone	+
	Biaxial	+
	Extension	parallel
Styracin	Character mineral	+
	Character zone	—
	Biaxial	+
	Extension	inclined

The remaining mass after the removal of the esters and acid was shown by Tschirch and von Itallie to contain styresinol, a cinnamic acid ester formation similar to that found in Asiatic styrax. Styrax often deposits resin when rubbed

[1] "Optical Methods in Identification of Organic Compounds" (pamphlet).

upon the skin, even when mixed with oil. I obtained this styresinol by digesting a quantity of styrax for twenty-four hours at 30° with a one percent solution of caustic soda. The substance was light yellow, amorphous and melted between 154° and 161°. I could not obtain this in crystalline form. As styrax does not owe its efficacy to storesin, the resin of styrax, this may be removed by treatment with petroleum ether. Tschirch and von Itallie determined the formula of styresinol, which they report as a white amorphous powder, $C_{16}H_{22}O_2$. I was not able to obtain this in a seemingly pure state.

The volatile oil (1.5–2.0%) obtained by steam distillation has been identified as styrol $C_6H_5CH:CH_2$, a phenyl substitution product of ethylene, and identical to that obtained from the Oriental species. B. pt. 145°; sp. gr. 0.070; dextrorotatory 16° 30″. Meta styrol, solid, is not obtainable by prolonged heating in a sealed tube of the styrol from American styrax. This is easily obtained from the synthetic styrol. The optical rotation of the purified balsam was also determined. Two solutions, one an ethereal solution made from 10 Gm. balsam, 10 Gm. NaOH solution, and shaking with 50 Gm. ether; the other an alcoholic solution prepared by distillation of the ether from the above, and dissolving the residue in four times its quantity of alcohol. Specific rotation in each case was found to be (20°) 6° 20″.

A white amorphous body, styrogenin, is reported by some investigators to be present in styrax, but taking up their procedure with American styrax, I was not able to isolate any such body. The leaves of the American species possess a turpentine-like odor when bruised and yield when distilled a very small but varying portion of greenish yellow oil; sp. gr. 0.87, and having a rotatory power of 38° 45″. This oil consists of a terpene, borneol, and borneol acetate.

The balsam is as difficult to collect as is our Canada balsam, which is probably the greatest cause for a somewhat constant decrease in its use during the past years. The tree is one of the most ornamental of the American forests; the leaves are deeply lobed, fragrant, and turn deep crimson in the autumn. The bark develops an excrescence, this latter forms a pocket which secretes the balsam. Very often these pockets occur near the ground; when they occur near the top of the trunk, the balsam is collected with much more difficulty. To some extent, the trees in the South have been girdled in the spring, and the large yellow drops, first forming, harden and the balsam may be gathered. Trees thus killed often go to waste. In some cases young trees, which yield more balsam, are used, and the larger trees, suitable for timber, are thus saved. It has been suggested that a system of rotation be thus established.

In the early spring, the trees are wounded by making shallow cuts in the branches, and these develop into resin pockets, with deposits of from one to four pounds. The previous summer's bark is easily removed. Often a cut is made in the excrescence and the balsam collected in the same manner as in the rubber industry, the balsam being led to a suitable container by means of a gutter. The balsam is skimmed off the top, and that still remaining in the bark is then extracted by placing the bark in horse-hair bags and pressing. The dried bark may then be used for fumigation.

American styrax is widely distributed from Connecticut to southeastern Missouri, south to Tampa Bay, Florida, through Arkansas and Oklahoma to

Texas, and then south to Mexico. There are some trees further north, but these are said to possess a lower balsamic content. The trees of the American species measure when well matured from five to twelve feet at the base, and often attain a height of 150 feet. The wood is exceedingly hard, and straight, close-grained, but not very strong. The roots spread widely and rapidly, and deeply under the ground. The sapwood has upwards of sixty layers of annual growth.

Among the common names for American styrax are sweet gum, gum wax, liquidambar, and copalm balm. Levant styrax has lately been quoted at $8.00 a pound, and very little on the market; American styrax is not quoted regularly; it should even now be produced at a figure less than half of this. In contrast to the Levant species the American variety seems to be exempt from insect injury. The outlook for larger use of American styrax seems encouraging.

STUDIES ON THE PHARMACOLOGY OF DIGITALIS BODIES.

I. THE ACTIVITY OF THE DIGITALIS GLUCOSIDES.

BY THOMAS S. GITHENS.*

In 1910 I began studies in this laboratory with a view to making a preparation of digitalis which would avoid as far as possible the irritating and nauseating properties of the crude drug, while retaining its entire physiologic and therapeutic powers. Experiments were made with the two usual methods of preparing digitalis glucosides; namely, the precipitation of inert matters by lead acetate; leaving the active glucosides in solution; and the precipitation of the glucosides by tannic acid followed by their further purification. It was, however, found that both of these methods destroyed a large proportion of the active constituents and that the glucosides which remained were altered in some obscure manner, so that they no longer represented the drug properly. An attempt was therefore made to separate and purify the active constituents without the use of powerful chemical agents.

In order to understand the problem presented it is advisable to describe briefly the chief constituents of digitalis, active and inert. Digitalis contains at least four active glucosides, of which only two are of importance; namely, digitoxin and digitalein. Gitalin, described by Kraft[1] as the chief active principle, was established by later work of Kiliani[2] to be a mixture of glucosides, altered by chemical manipulation. Digitoxin and digitalein resemble each other closely in physiologic and therapeutic action, but differ widely in solubility, absorbability and in power to resist destructive agencies. Digitoxin is freely soluble in alcohol, even more soluble in chloroform, but insoluble in pure water. It is, however, soluble in a solution of the saponin which is present in digitalis leaf and it is therefore extracted from the leaf by water. Digitalein is insoluble in chloroform and ether, freely soluble in water, and sparingly soluble in alcohol. It is well extracted from the drug by alcohol, only if the drug be powdered. Its solubility in alcohol is

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[1] F. Kraft: *Arch. der Pharm.* 250, 118, 1912.

[2] H. Kiliani: *Ibid.*, 252, 13, 1914.

increased by the presence of dilute alkalies, which, however, do not seem to alter it, and it is dissolved by mixtures of alcohol and ether in the presence of alkali.

Digitoxin and digitalein differ, furthermore, in their resistance to destructive agencies. The former is not materially affected by treatment with lead acetate and can be precipitated by tannin and recovered from the combination, without loss of its physiologic activities. It is also relatively resistant to heat. Digitalein, on the other hand, is very sensitive to strong chemical agents. If a preparation containing it is treated with lead acetate, it will be found that it has lost from one- to two-thirds of its activity. It cannot be recovered in an uninjured form from the combination which it forms with tannin. In addition it is readily injured by heat, temperatures above 45° to 50° C. reducing its activity markedly.

An average, good specimen of leaf contains about 0.25 percent of digitoxin which lends the leaf from one-third to two-fifths of its activity. The amount of digitalein is not readily determined by chemical tests but, judging from partially purified specimens, there is about 0.5 percent. As it is slightly less active than digitoxin it accounts for three-fifths to two-thirds of the activity of the average leaf. The proportions of the two glucosides vary, in extreme cases, within much wider limits. The digitoxin may account for more than half the activity of the drug or may be almost entirely wanting.

It may not be superfluous to point out that many statements in regard to the chemistry of the leaf in current textbooks are at fault owing to the failure to realize that the chemistry of the leaf differs widely from that of the seed. The chief active constituent of the seed is a glucoside, digitalin (*digitalinum verum*); small amounts of digitalein are also found, but there is no digitoxin. The chief other component is a saponin, digitonin, which is not present in the leaf. The saponins of the leaf are often incorrectly spoken of by this name.

In addition to the active glucosides, the leaf contains a very large amount of tannin, constituting, in water and dilute alcohol extracts, the largest part of the solids, and amounting to as much as 16 to 20 percent of the weight of the dried leaf. The tannin is of great importance in helping to cause the bad taste and nauseating properties of the crude drug. Beside the tannin, the only inactive component of great importance is the saponin fraction. This consists apparently of a mixture of several saponins which are not readily separated from each other or from the active glucosides. The saponins are of great pharmaceutic importance, as digitoxin is soluble in an aqueous solution of saponin and through its presence the digitoxin is present in aqueous preparations of the leaf, such as the infusion. The saponins are not only extremely irritating topically, but are hemolytic.[1]

CHEMICAL STUDIES.

The differences in the solubility of the two active glucosides, and the impossibility of treating the water-soluble ones with strong chemical agents, made

[1] In view of several recent statements that the saponins of digitalis leaf are not hemolytic, I would add that saponins separated as described below caused complete hemolysis of 1 Cc. of rabbit blood in amounts containing only 2 mg. of solids and corresponding to 8 mg. of leaf. The tubes were kept one hour at room temperature in hot weather. According to McGill (*Jour. Am. Chem. Soc.*, 42, 1900, 1920), this action depends on impurities.

it evident that better results were likely to be obtained in their purification if they were first separated. Attempts were made to remove the digitoxin from the digitalein by first extracting the drug with dilute alcohol, and after driving off the alcohol, shaking out with chloroform. This method, modified in several ways, did not lead to complete extraction of the digitoxin and an attempt was therefore made to extract the drug first with chloroform and then to obtain the digitalein by extracting the marc left after this preliminary extraction. This method proved to be so thoroughly satisfactory that it was used in all later studies.

THE CHLOROFORM EXTRACT.

If digitalis leaf, powdered finely, is extracted with chloroform, a dark green fluorescent liquid is obtained, which, on evaporating off the chloroform at moderate temperature, leaves a dark green, very sticky and greasy mass, with a characteristic digitalis odor. This extract is partly soluble in benzine and a larger portion is soluble in ether. It is almost completely soluble in hot alcohol but not readily taken up by cold. It represents about 3.5 percent of the total weight of the dried leaf and contains, in addition to the digitoxin, chlorophyll, which gives it its color; fats; a fixed and a volatile oil; free fatty acids, and coloring matters. As most of these substances are not soluble in dilute alcohol while the active principle is, the material may be purified by dissolving in hot alcohol and treating with an equal volume of water. There results, on filtration, a somewhat turbid yellow liquid which cannot be filtered clear through filter paper, and cannot be treated with kieselguhr as this adsorbs digitoxin (in contrast to digitalein). A perfectly clear and satisfactory solution may, however, be obtained if 1 percent of alum is added to the water before adding it to the alcohol solution. Alum is very slightly soluble in 50 percent alcohol, and almost all the alum is thrown down with the solution and filtered off. As it was felt that this process gave an undesirably high percentage of alcohol, it was later modified by dissolving the chloroform extract in a smaller amount of hot alcohol and adding four volumes of water. The solution obtained on filtering this mixture is clear, light yellow, and smells of digitalis. An average lot contains about 1.4 grammes of solids for every hundred grammes of leaf. The activity of a good specimen is such that less than 2 mg. are required to kill a guinea pig weighing 250 grammes, while 0.02 mg. per gramme will stop the heart of a frog (*Rana pipiens*) within an hour.

THE WATER-SOLUBLE GLUCOSIDES.

The marc left after extracting the leaf with chloroform was treated with many different menstrua, chiefly various dilutions of alcohol, in an attempt to determine which extractive was best suited to remove the residual activity. It was found that the amount of active matter was identical in extracts made with any percentage of alcohol from water to 75 percent, but that if stronger alcohol were used, extraction was apt to be incomplete. The total amount of solids removed was fairly constant with all dilutions until concentrations above 75 percent were reached. Thus, from the same lot of leaf, 5 percent alcohol removed 425 grammes of solid per kilo; 75 percent removed 430 grammes; while 95 percent removed only 125 grammes.

The difference in the amount of solids is mainly due to the tannins which are not soluble in strong alcohol, and can be precipitated from extracts contain-

ing them, by merely increasing the percentage of alcohol. The solubility of tannins in alcohol is decreased by alkalinity, while the solubility of the active principles is increased. It is thus possible to bring about extraction under more favorable conditions, and to obtain an active extract almost free from tannin, by extracting with 95 percent alcohol rendered strongly alkaline by ammonia vapor. An extract prepared in this way still contains the saponins, which are soluble in alcohol even in the presence of alkalies.

The saponins may be separated from an alcoholic solution containing both them and digitalein, by adding ether, which throws them down, but leaves the glucosides in solution. It seemed possible that both the tannins and saponins might be removed from the glucosides by treating a dilute alcoholic solution with ether. This forms layers, an alcohol-water layer below and an alcohol-ether layer above. There is no tendency to form emulsions. Trial proved that this method was feasible. The best proportions were found to be 45 parts of water, 55 parts of alcohol and 120 parts of ether. With this mixture, the lower layer, which measures less than 45 parts, contains almost all of the tannins and saponins, while the upper layer contains all the active matters. This separation is sharp, only when the reaction is alkaline, which is best provided for by adding a sufficient amount of strong ammonia water.[1]

In view of the solubility of the active principles in a mixture of alcohol and ether, attempts were made to extract the chloroform marc with such a mixture. Experiments showed that a satisfactory extraction could be accomplished with a mixture consisting of alcohol 10 parts, ether 40 parts and strong ammonia water 1 part. After complete extraction, which requires less than 10 volumes of the mixture, the extract is treated with one-tenth volume of water, which forms a small layer. This takes out almost all of the small amounts of saponin and tannin which have been extracted, as well as almost all the excess ammonia. The upper layer from this extraction is evaporated almost to dryness *in vacuo* and the residue treated with water. A turbid, pale yellow solution results which cannot be cleared by filtration through paper but can be filtered through kieselguhr or through an earthen filter candle without loss of activity. The solution obtained in this way contains all the activity remaining in the chloroform extracted drug but contains very little extractive matter. A properly made specimen should kill a 250 Gm. guinea pig in a dose which contains only 1 to 2 mg. of solids.

This solution of the watery principles has shown very little loss of activity in six months, but on account of the absence of alcohol in the finished preparation, a preservative must be added to prevent growth of fungi, to which it is very liable. Addition of 0.5 percent sodium benzoate has been found more suitable for this purpose than other preservatives which were tried.

PHARMACODYNAMIC STUDIES.

Both the preparations just described, *i. e.*, the digitoxin and digitalein, have been used in a large series of experiments on animals with a view of determining whether each of them represented the full activity of digitalis. It was found

[1] Githens, *Jour. Pharm. & Exp. Ther.*, 15, 245, 1920.

that their action, as judged by qualitative studies, is identical. Both kill guinea pigs in small doses and the symptoms preceding death, such as nausea and convulsions, are the same. They raise the blood pressure of the rabbit to about the same extent and slow the heart equally. Both show an uncertain diuretic action; the amount of diuresis and the number of animals exhibiting it do not differ much. Both substances cause strong contraction of the isolated uterus and the amounts required to produce a given degree of contraction are not very different. It may therefore be stated that their actions are apparently qualitatively identical.[1]

While the above work was under way an important article on the relative actions of the chloroform- and water-soluble glucosides of digitalis appeared from the laboratory of Professor Robert A. Hatcher.[2] Dr. Hatcher has shown that the most important difference between these glucosides lay in their absorbability in the digestive tract and their liability to destruction in the stomach and bowel. He found that the chloroform-soluble glucoside, that is to say, the digitoxin, was readily absorbed from the gastroenteric tract and developed its full activity when administered by mouth; the water-soluble glucoside, on the other hand, that is, the digitalein, was poorly absorbed from, or largely destroyed in the digestive tract, so that when it was administered by mouth it showed very much less activity than when injected subcutaneously or intravenously.

It is evident from these facts that if a mixture of the two principles is administered by injection the full effect of each will be developed and the total effect will be the sum of the separate activities. If, on the other hand, such a mixture be given by mouth, the digitoxin only will develop its full effect, and the activity of the preparation will be less than would have been anticipated. If the preparation or the crude drug containing such a mixture happened to be rich in digitoxin, the activity by mouth would approach that by injection, whereas if it were relatively poor in digitoxin, the effect would be much less than might have been anticipated from the results of the drug given hypodermically. The importance of these considerations is dependent on the fact that all preparations of digitalis on the market are standardized by subcutaneous injection (in frogs or guinea pigs) or by intravenous injection (in cats). It is obvious that if any preparation is unduly poor in digitoxin and rich in digitalein, the physiologic assay will show it to be much stronger than it will later appear in the clinic when administered by mouth.

From the facts shown by Dr. Hatcher it is plain that a preparation containing only the digitoxin is more suitable for administration by mouth than a preparation containing the total glucosides of the leaf. On the other hand, it is well known that digitoxin is much more irritating topically than digitalein and for this reason a preparation containing only the latter is better adapted for hypodermic administration. Preparations made by the methods described would seem, therefore, to be better adapted to clinical use than the usual preparations containing both glucosides.

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[1] Githens, *Jour. Pharm. & Exp. Ther.*, 15, 239, 1920.

[2] R. A. Hatcher, and C. Eggleston: *Ibid.*, 12, 405, 1919.

THE DETECTION OF CAMPHOR OIL IN THE NATURAL OIL OF SASSAFRAS.

BY E. H. GRANT.*

Sassafras oil is defined by the United States Pharmacopoeia IX as "A volatile oil distilled from the root of *Sassafras variifolium* (Salisbury) O. Kuntze (Fam. *Lauraceae*)." It is used extensively as a flavor, being the basis of the so-called "sarsaparilla" flavors, as a mild antiseptic, as an ingredient of liniment and as a perfume, especially in cheap toilet soaps. The principal constituent of this oil is safrol, which is present to the extent of about 85 percent. When Schimmel & Co. showed the presence of safrol in camphor oil and developed methods for separating it in a fairly pure state, imitation oil of sassafras was soon an ordinary article of commerce and at present is used in much larger quantities than the natural oil of sassafras.

As by-products in the manufacture of camphor, there are obtained various waste camphor oils, varying much among themselves in specific gravity, color and composition. Certain of the darker oils rich in safrol are called "sassafrassy oils of camphor" and are used in the manufacture of imitation oil of sassafras. The safrol is frozen out and pressed. The residual oil is fractionated and certain fractions of suitable specific gravity are mixed with safrol to give a product very similar in composition to natural oil of sassafras.

The commercial synthetic oils, carefully made, have the same specific gravities as natural oils. Their optical rotation, however, is usually low, in the neighborhood of $+1.75°$ at 25° C., whereas the U. S. P. limits are $+3°$ to $+4°$. Since many natural oils polarize much below $+3°$, the optical activity is not very valuable in detecting an adulterated or synthetic oil.

The reported constituents of sassafras oil are safrol, eugenol, pinene, phellandrene, *d*-camphor, sesquiterpenes and unidentified substances of high boiling points (Power and Kleber, *Pharm. Review*, 14, p. 101). Various chemists in reporting on camphor oil have shown it to be a very complex mixture and to contain, among other compounds, all of those mentioned as being present in sassafras oil. Schimmel & Co. report the chief phenolic body present to be eugenol, with traces of carvacrol. By the method outlined below, I have found that carvacrol is probably the predominating phenol in such waste camphor oils as are used for the manufacture of safrol. As I have not examined all varieties of camphor oil, however, I am not prepared to state that this is generally the case. Examination of five samples of "sassafrassy oils" obtained through the U. S. Customs Service from importations and of numerous commercial imitation sassafras oils showed that the bulk of the phenols is carvacrol, while eugenol is present in comparatively small amounts. Applying the same test to commercial safrol made from waste camphor oil showed it to contain traces of one or more other phenols whose identity was not determined.

The method used depends on the formation of various colored diazo dyes and is as follows:

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* Research Chemist, Wm. S. Merrell Co., Cincinnati, O. Work was performed while in charge of drug laboratory, New York Station, U. S. Bureau of Chemistry.

Dilute about 5 Cc. of the oil with about 20 Cc. of petroleum ether. Add 5 Cc. of water and 1 Cc. of 10% NaOH. Shake out the phenols, draw off the aqueous layer and acidify it. In another beaker put 5 Cc. of water, a few drops of 10% H_2SO_4 and then 1 Cc. of a saturated alcoholic solution of paranitraniline. Add a 1% solution of $NaNO_2$ drop by drop until the yellow color of the paranitraniline is almost destroyed. If, for any reason, the color is not destroyed evenly and quickly by the nitrite, this indicates that the diazotization is not proceeding correctly, and the solution must be discarded and a new lot diazotized with greater care. Add a small amount of dry urea to destroy the excess of nitrite. Pour the phenolic solution into the diazotized paranitraniline solution. Make alkaline with 10% NaOH and then just acid with dilute H_2SO_4. Extract with petroleum ether. Draw off the ethereal layer and free it from any solid particles of dye floating in it or adhering to the sides of the separatory funnel. Add about 20 Cc. of water and a few Cc. of 10% NaOH to the petroleum ether in a separatory funnel and shake. Draw off the alkaline layer and filter it through filter paper to free it from petroleum ether. Treat authentic samples of sassafras oil and synthetic sassafras oil from oil of camphor in the same way. Dilute the three solutions until the depth of color is practically the same in all, and is of a strength best suitable for comparison. The phenols from natural oil of sassafras give a purplish red color; those from waste camphor oil give an orange-red color; a mixture of these two gives an intermediate tint.

This method, while it gives a good idea of the relative proportions of the two oils in a mixture, is not suited, without modifications, for an exact quantitative determination. If ether is substituted for petroleum ether, the dye can be extracted quantitatively, but is not obtained in as pure a state in the final stage.

The phenols from sassafras oil give a dye identical in shade with that of the dye made from eugenol. The phenols from synthetic oil or waste camphor oil give dyes the same in shade as that made from carvacrol, except that the dyes from these oils tend slightly towards purple, indicating the presence of a trace of eugenol.

Five samples of sassafras oil were distilled in the laboratory from commercial samples of sassafras root bark from various parts of the United States. Generally the exact source was not known accurately, but one sample was collected especially for this work from western North Carolina. One sample of oil was distilled under constant supervision of members of the Bureau of Chemistry at a commercial plant in Junction City, Ky., from the whole sassafras roots and stumps ground up in the usual commercial manner. Examination of these oils and of many commercial samples of probable purity all yielded dyes of an identical shade.

Mr. E. K. Nelson, of Washington, D. C., has called my attention to the necessity of using pure paranitraniline in this test. He was unable to obtain satisfactory results with the commercial chemical, but did obtain good results later with a purer preparation. Another important point to be observed is to see that the diazotizing proceeds in an orderly manner so that excessive amounts of colored by-products are not obtained.

The author regrets that press of work and, later, his resignation from the Government service have prevented him from investigating this subject further.

EXPERIMENTAL PHARMACODYNAMICS FOR STUDENTS OF PHARMACY.*

BY A. RICHARD BLISS, JR.

Following the reading of the writer's paper entitled "Pharmacodynamics in Schools and Colleges of Pharmacy"[1] before the Section on Education and Legislation of the American Pharmaceutical Association at the New York meeting last August, there were addressed to him between fifteen and twenty letters of inquiry by various schools and colleges of pharmacy concerning the following:

1. The number of hours deemed necessary for a *General Course* in Pharmacodynamics, including didactic and laboratory work, in the School of Pharmacy.
2. An outline for a course in Experimental Pharmacodynamics for the pharmacy student to show the scope of the laboratory work.
3. The materials required for giving a laboratory course in this subject and the approximate cost of the same.

It is the endeavor of the writer to cover the foregoing topics in this paper, and it is his hope that the material submitted may prove of some use to the schools of pharmacy and that it may lead to some discussions, suggestions and criticisms that will foster the rapid development of proper instruction in this important branch of pharmaceutical education.

The fact that 51 percent of the pharmacy schools are already claiming to be giving instruction in pharmacodynamics, that 52 percent of the schools that are not at present giving such instruction have signified that they consider it a desirable addition to their courses,[2] and the fact that the United States Pharmacopoeia recognizes several pharmacodynamic methods of standardization all serve to indicate the growing importance of this comparatively new subject of the medical and pharmaceutical curricula. Although 51 percent of the schools have indicated in their replies to the questionnaire[2] sent them last summer that instruction in this subject is being given, analyses of the replies and a study of the catalogue material of these schools have shown that a rather high percentage (about 62 percent) of these schools are not giving instruction that could be properly termed instruction in pharmacodynamics along with a laboratory course. One is hardly justified in calling instruction in Materia Medica that includes under each drug a statement or two concerning the uses a course in pharmacodynamics. Neither is one justified in calling the macroscopic and microscopic examination of drugs Experimental Pharmacodynamics. These things are, of course, important and have their proper place in the courses of study, but they cannot be substituted for the subject under discussion. It is undoubtedly true that there are some schools of pharmacy that are giving excellent courses in pharmacodynamics including the proper kind of laboratory work, but, unfortunately, no data concerning such instruction are available at this time. It is further true that there are three or four schools that require the pharmacy student to take the same courses in pharmacology that the medical student in these institutions must take,

* Joint session Section on Education and Legislation, A. Ph. A., American Conference of Pharmaceutical Faculties, and National Association of Boards of Pharmacy, City of Washington meeting, 1920.

[1] JOUR. A. PH. A., 9, 378, 1920.

[2] *Ibid.*, 9, 382, 383, 1920.

and that the instruction is given to the medical and pharmacy student in one section. The writer seriously doubts the wisdom of this method. It seems hardly necessary to point out that the previous training of the pharmacy student in anatomy, physiology, etc., does not fully qualify him for such extensive courses given in the medical school; and, what is possibly more important, that such extensive courses are unnecessary and possibly undesirable for the pharmacy student even though he were fully qualified to pursue and profit by the instruction.

A large proportion of the schools reporting actual instruction in pharmacodynamics including laboratory work are limiting the laboratory work to the pharmacodynamic assays of the United States Pharmacopoeia.[1] This instruction should, of course, form an important part of the work and occupy a fairly high percentage of the total laboratory hours given to the subject; but if the laboratory course is limited to such work it is quite incomplete, not satisfactory, the work itself is likely to be carried out in a rather mechanical fashion, and does not serve the full purposes of Experimental Pharmacodynamics in the pharmaceutical courses. On the other hand 61½ percent of the schools giving courses in pharmacodynamics are offering no laboratory work whatsoever.

The majority of the schools have apparently decided that the subject is essential enough and important enough to warrant its addition to the pharmaceutical curricula (this has been done by 51 percent of the schools),[1] that didactic instruction alone will not suffice, and that an elemental course in Experimental Pharmacodynamics, suitable for and useful to the pharmacist, should be given. Dr. Francis E. Stewart, in his excellent paper entitled "Shall We Reorganize the American Pharmaceutical Association?"[2] says: "Pharmacy is inherently and historically a branch of medical science and practice and, therefore, can never become a profession independently of the medical profession. * * * —it does require a pharmaceutical education of a high order to qualify a pharmacist for the vocation of selecting, preparing, compounding, and dispensing of medicine to meet the demand of *rational drug therapeutics* as practiced by educated and competent physicians. * * * That pharmacy and *drug therapy* (medicine) shall be conducted as closely related and mutually dependent branches of medical science and practice; that the practitioners of these important vocations shall work in coöperation with a common object, namely, to prevent disease and heal the sick, each profession working in its special field of practice." It is the opinion of the writer that the pharmacist will be unable to coöperate to the fullest extent in this important work of preventing disease and healing the sick, will be unable to perform his part of such scientific endeavor in an entirely satisfactory and efficient manner unless he has, as Sollman expresses it,"[3] an intelligent understanding of the broad principles that guide treatment, of the objects which are to be accomplished, and of the means that are utilized." It should be the object of any course in General Pharmacodynamics in a school of pharmacy to give the "pharmacy student that information that will prove useful to the pharmacist without burdening him with unnecessary and possibly dangerous material."[3]

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[1] Jour. A. Ph. A., 9, 381, 382, 1920.

[2] *Ibid.*, 9, 263, 1920.

[3] Sollman, "The Action of Drugs," p. 18.

The writer ventures to state that there is no other subject in the medical and the pharmaceutical curricula that will tend more to bring the physician and the pharmacist closer together, that will foster that relationship and coöperation between the medical and pharmaceutical professions that all of us are looking forward to as ideal, that will assist in securing that recognition of pharmacy as a profession by the medical brotherhood, than proper instruction in pharmacodynamics in the schools of pharmacy; for it is the real basis of relationship between the two professions. The topic of most discussions between physician and pharmacist is—useful drugs. The physician is interested, more or less, in all the phases of pharmacology as usually taken up in the pharmacy school, but he is most interested in the pharmacodynamics, and it is at this point that the discussions usually abruptly stop because of the fact that the large percentage of pharmacists know little if anything about this branch of pharmacology. Thus a gap, a chasm of separation springs up between the two and abruptly cuts short a discussion that has probably proved useful and valuable to both parties up to this point, but it remains incomplete, broken at this most interesting and important phase of the conversation. Let the pharmacy school foster and develop proper instruction in this branch of pharmacology and considerable additional headway toward that ideal relationship between medicine and pharmacy referred to above will be surely made in a very short period of time.

The three topics, discussed in the communications mentioned in the first paragraph of this article, will be taken up in the order there given.

1. THE NUMBER OF HOURS NECESSARY FOR A GENERAL COURSE IN PHARMACODYNAMICS.

The average number of hours being given to the subject of pharmacodynamics by the schools and colleges of pharmacy, as shown by the replies to the questionnaire last summer,[1] is 60, including both didactic and laboratory instruction. This number, in the writer's opinion, is sufficient. There seems to be but little uniformity, however, in the proportion of didactic to laboratory work. It is highly desirable to devote from one-half to two-thirds (30 to 40 hours) of these hours to laboratory work; that is, Experimental Pharmacodynamics. If the instruction in Materia Medica follows the method of taking up the drugs in groups classified according to similarity of action, much of the didactic instruction in pharmacodynamics can be taken up in that course, thereby leaving more time for the experimental work. It is the writer's conclusion, based upon twelve years of experience in teaching pharmacology in the medical, the dental, and the pharmaceutical school, that the most efficient and satisfactory method of instruction in Materia Medica and pharmacodynamics is the plan of taking up the drugs in pharmocodynamical groups, considering first the usual topics included in the study of Materia Medica under each individual member of the groups, following this briefly with the pharmacodynamics of the most important member of each group, going from this phase of the study into the toxicology, and completing the material with the most important uses and methods of administration. The medical school devotes from about 200 to 300 hours to instruction in pharmacology, from 90 to about 150

[1] JOUR. A. PH. A., 9, 381, 1920.

hours of which are devoted to laboratory work. Such an extensive course is unnecessary and undesirable for the student of pharmacy. If a total of 200 hours, including about 90 hours of laboratory work, is sufficient for the medical student, surely a total of 60 hours, including from 30 to 40 hours of laboratory work, is sufficient for the student of pharmacy. In the outline of laboratory work that appears below it will be seen that the course suggested fits into the above number of hours very nicely.

2. AN OUTLINE FOR A COURSE IN EXPERIMENTAL PHARMACODYNAMICS FOR STUDENTS OF PHARMACY.

The elementary laboratory course outlined on the next page is necessarily somewhat unevenly balanced. The writer has tried to keep in mind the limitations likely to be found in the average school of pharmacy, particularly in the cases of those schools that are not connected with a university having a medical school and in the cases of schools in which the subject is of very recent introduction. The course is better adapted for the development of some pharmacodynamic facts than of others, and, as a result, it is possible that the student will be led to place undue stress upon the former. However, this possible drawback can be readily overcome by a didactic course properly balanced for the pharmacy student. In order to keep the experiments within the scope of the experimental knowledge of the average student of pharmacy, they have been made as elementary as possible. Time is, of course, an important consideration in an abbreviated course of this kind; therefore, demonstrations may be resorted to advantageously if they are arranged in such a manner that as many students as possible actually assist in the experiment and that every student may see the work. A considerable portion of the work outlined below can be carried out, if necessary, in this fashion. Additional time may be saved by having sections of the class perform analogous experiments but using different drugs, and having the results of each section reported and demonstrated to the entire class. The experiments compiled below have been chosen because they demonstrate certain fundamental pharmacodynamic facts and methods in the simplest manner. The purposes of the instruction in pharmacodynamics in the school of pharmacy should be impressed upon the student. He should be indelibly impressed with the fact that he is not being prepared to treat disease; that his training and knowledge do not qualify him for such work, that he is receiving an elementary course in the subject which is considered sufficiently complete and thorough for the pharmacy student but not for the medical student; that the information that he can derive from the laboratory work forms the proper basis of the didactic instruction, will materially assist him in understanding those facts that are deduced from the experiments, will illustrate their value, and will impress them upon his memory; that the primary object of the course is to enable him to better coöperate with the physician because of the fact that through this laboratory work and didactic work in pharmacodynamics he will have an intelligent understanding of "the broad principles that guide treatment, the objects which are to be accomplished, and the means that are utilized *by the physician.*"

The student's notebook is a most essential and important part of the laboratory course. He should have a definite conception of the purpose of each experi-

ment before he carries it out; he should carefully make detailed notes during the progress of the experiment; and finally draw brief and concise conclusions. There is nothing that develops the powers of observation like the careful taking of detailed notes during the progress of experiments. In addition the critical faculty of the student is stimulated by condensing the detailed account of the results of experiments into concise conclusions.

A feature of the laboratory work that may well be stressed, in addition to the pharmacodynamic assays, is that part concerned with toxicology, for it is doubtless true that a larger number of cases of poisoning are given first aid by the pharmacist than by the physician. Instruction in experimental pharmacodynamics will certainly enable the pharmacist to more intelligently and efficiently institute preliminary treatment in such emergency cases. In the laboratory work dealing with toxic drugs, when the animal is to be sacrificed, the action of the drug should be pushed to the toxic stage in order to give the student the opportunity to see, to study, and to learn to recognize the toxic action of the more important poisonous drugs. Advantage should also be taken of opportunities to illustrate the treatment of poisoning.

The course outlined consists of sufficient work for thirty laboratory periods of one hour each or fifteen periods of two hours each. It is believed that the material will be found suitable, interesting and valuable to the pharmacy student. Although the work includes experiments on animals, the technique is simple, the intact animal being employed in the majority of instances. A fair proportion of the experiments are carried out on the student himself, for the worker will find the experiments most instructive, in certain types of laboratory work, if he performs as many as possible on himself. In arranging the course the writer has drawn freely on the works of Sollman, Greene, Edmunds and Cushny, Jackson, McGugin, Bush, Pittenger, Pembrey and Phillips and others, all of which were prepared for the medical student or advanced workers in the field of Pharmacodynamic Assays.

Period 1. Absorption and Excretion of Drugs.—A short series of simple experiments on rabbits, dogs and guinea pigs to illustrate: (*a*) Systemic Action; (*b*) Methods of Administration; (*c*) Sites of Absorption; (*d*) Rapidity of Absorption; (*e*) Effects of Colloids on Absorption; using the drugs Strychnine, Nicotine, Ether and Chloroform; (*f*) the Decomposition of Drugs in the Organism, using Potassium Iodide and Calomel to illustrate that chemical reactions may take place between two or more drugs within the body, and using Potassium Iodide and saliva to show that chemical reactions may take place between the drugs administered and normal body constituents; (*g*) Sites of Excretion; (*h*) Rapidity of Excretion; (*i*) the Excretion of Volatile Drugs by the Lungs; (*j*) the Form in Which the Drug Is Excreted (changed or unchanged); using Acetphenetidin, Phenyl Salicylate, Rhubarb, Quinine, Copaiba, Methylene Blue, Iodides, Antipyrine, Methyl Salicylate, Sodium Acetate, Sodium Citrate and Hydrogen Sulphide.

Period 2. Protectives: Demulcents and Emollients.—A few simple experiments to illustrate that these substances (1) lessen the effects of irritant drugs, using decapitated frogs and diluted solutions of Hydrochloric Acid in water, in a demulcent, and in an emollient to show the effect on the "Reaction Time;" (2) that they lessen the intensity of characteristic tastes, using solutions of Citric Acid in water and in Starch Paste; and (3) that they may interfere with the absorption of drugs (see Period 1).

Period 3. Counterirritants.—Experiments to illustrate the phenomenon of *"Inflammation,"* the four successive stages—rubefaction, vesication, pustulation and corrosion—and the treatment of irritation. The action on the *Skin* may be readily shown by having the student apply to his forearm (*a*) Chloroform by rubbing, (*b*) Cerate of Cantharides, (*c*) 10% Ointment of Anti-

mony and Potassium Tartrate; on the *Mucous Membrane* by having him (*d*) snuff a little powdered Soap Bark or well diluted Veratrine, (*e*) taste 10 times diluted Tincture of Aconite, Alum, Tincture of Ferric Chloride, (*f*) place a drop of Tincture of Iodine on the inner surface of the lip; and lastly the *Treatment of Irritation* may be illustrated by having him immerse the fingers of one hand in 5% solutions of Phenol in Water, Alcohol, Glycerin, Turpentine and Cottonseed Oil.

Period 4. Caustics (Astringents, and Styptics).—A—The Action on Proteids and Blood: Test-tube experiments using Egg Albumin and defibrinated Blood, to separate portions of which are added solutions of Hydrochloric, Sulphuric and Nitric Acids, Potassium and Sodium Hydroxide, Mercuric Chloride, Copper Sulphate, Lead Acetate, Ferric Chloride, Silver Nitrate, Alcohol, Phenol and Tannic Acid. Results are noted and conclusions drawn as to which might be used as Astringents and Styptics. *B—The Action on Skin, Mucous Membranes and Muscle:* Test-tube experiments in which pieces of fresh dog's skin, intestine and muscle are treated with the same reagents. *C—Stains on Human Skin:* Drops of concentrated Nitric Acid, Hydrochloric Acid, Sulphuric Acid, Picric Acid, Tincture of Iodine, Silver Nitrate Solution, Phenol and Methylene Blue are applied to the student's forearm and the characteristic color, intensity of action, etc., etc., noted. Advantage is taken of the opportunity to study methods for the removal of such stains and immergency local treatment in cases of poisoning.

Period 5. Digestive Ferments.—Test-tube experiments with Milk and Rennin in the presence of Water, Diastase, Pancreatin, Formaldehyde and Sodium Citrate. Also methods for standardizing Pepsin, Pancreatin and Diastase.

Period 6. Emetics.—Experiments on dogs to illustrate the classes of Emetics, using Apomorphine, Zinc Sulphate, Copper Sulphate, Ipecac, Antimony and Potassium Tartrate and Mustard, the rapidity of action, etc., and also employing Morphine to show the primary emetic action and the secondary paralysis of the vomiting center.

Period 7. Anthelmintics.—The parasites may be obtained from the intestines of dogs sacrificed during some of the other experiments or common rain worms may be used. The relative activity of infusions of Aspidium, Quassia and Spigelia, 1/10% Mercuric Chloride solution, 1% Emulsion of Oil of Turpentine, saturated solution of Santonin, and 1–5,000 solution of Oil of Chenopodium may be studied.

Period 8. Cathartics.—This work may be carried out on the student himself as well as on dogs, to illustrate "laxatives," "purgatives," "drastics," rapidity of action, duration of action, intensity of action, after constipation, griping, etc., etc. Rhubarb, Senna, Cascara Sagrada, Aloin, Resin of Podophyllum, Jalap, Compound Jalap Powder, Magnesium Sulphate, Sodium Sulphate, Seidlitz Powder, Solution of Magnesium Citrate, Potassium and Sodium Tartrate, Potassium Bitartrate, Castor Oil, Sulphur, Calomel, Compound Cathartic Pills, Agar Agar, Phenolphthalein, and Liquid Petrolatum may all be included in this series.

Period 9. Racial Idiosyncrasy.—A short series of experiments on dogs, rabbits, frogs, toads and cats to illustrate the term "Idiosyncrasy" and to distinguish between it and "susceptibility" and "tolerance." Atropine, Digitalis, Strychnine, Apomorphine and Morphine may be used.

Period 10. Treatment of Poisoning.—A—Chemical Antidotes: Test-tube experiments to illustrate the objects for using and the manner of action of such chemical antidotes as Tea and Coffee, Iodine, and Potassium Permanganate for Alkaloids; Tannin and Albumin for Metallic Salts; Alkalies for Acids; Acids for Alkalies; Copper Sulphate for Phosphorus; soluble sulphates for Barium; Calcium salts for Oxalates; etc., etc. *B—Treatment of Poisoning:* Experiments on rabbits to illustrate (1) Removal of the poison; (2) Chemical Antidotes; (3) Mechanical Measures; (4) Physiological Antidotes. Strychnine may be used for one series, and such measures as the lavage tube, artificial respiration, catheterization, chemical antidotes, and Chloral Hydrate employed with individual animals. Caffeine may be used for acute alcoholic poisoning, and other demonstrations carried out.

Period 11. The Action of Drugs on the Circulatory System.—A—General Circulatory Stimulants: Experiments on frogs to study the actions of such drugs as Digitalis, Strophanthus, Epinephrine and Caffeine by (1) inspection of the exposed heart, and (2) by kymograph tracings. *B—Cardiac Depressants:* In the same fashion studying the effects of such drugs as Aconite and Veratrum. *C—The Effects on the Pulse and Respiration:* A short series of experiments on the student using small doses of such drugs as Digitalis, Atropine, Aconite and Amyl Nitrite. *D—*

The Effects on Blood Pressure: Using the student and such drugs as Ammonia, Sodium Nitrite, Epinephrine, Strychnine, Amyl Nitrite, Atropine, Nitroglycerin, Caffeine and Tobacco.

Period 12. Drugs Acting Chiefly on the Central Nervous System.—A—Stimulants: Experiments on the frog using such drugs as Caffeine and Strychnine. *B—Depressants:* Similar experiments using Ether, Chloroform, Morphine, Alcohol, Chloral Hydrate, etc.

Period 13. The Action of Drugs on the Pupil.—Experiments on cats or dogs with such drugs as Atropine, Physostigmine, Pilocarpine, Cocaine, and Dionin.

Period 14. Anesthetics.—A—Local: A series of experiments on rabbits, frogs and the student using such drugs as Cocaine, Novocaine, Stovaine, Quinine-Urea Hydrochloride, Aconite and Ethyl Chloride. *B—General:* Using dogs and Ether and Chloroform.

Period 15. The Action of Drugs on Muscle.—A—Frogs: Kymograph work with such drugs as Caffeine, Quinine and Veratrine. *B—Man:* Experiments on the student using the ergograph to show the effect of Caffeine and Alcohol on fatigue.

Period 16. The Action of Drugs on the Salivary Glands.—A—Man: Using the student for the administration of a little Diluted Acetic Acid by mouth, and a little Ether or Chloroform by inhalation. *B—Animals:* Using rabbits or dogs for the injection of Pilocarpine and Atropine.

Period 17. Diuretics.—A series of experiments on the students who will take such drugs as Caffeine, Alcohol, Theobromine Sodio-salicylate, Oil of Turpentine, Oil of Santalwood, and water.

Period 18. Antipyretics.—Experiments on rabbits using Chloral Hydrate, Morphine, Cocaine, and Antipyrine, Acetphenetidin and Antipyrine after Albumose and without the previous administration of Albumose.

Period 19. Antiseptics.—A—Urinary: A series of experiments on the student using Hexamethylenamin, Sodium Salicylate, Sodium Benzoate, Creosote, Methylene Blue, Boric Acid and Santal Oil. *B—Intestinal:* Using fresh pancreas and duodenum with Bismuth Subcarbonate, Calcium Carbonate, Calomel, Carbon, Creosote, Guaiacol Carbonate, Phenyl Salicylate, Sodium Phenolsulphonate, Sodium Salicylate, Tannin and Thymol. *C—Antiseptic Dusting Powders:* Using fresh defibrinated blood and Acetanilid, Betanaphthol, Bismuth Subnitrate, Boric Acid, Calcium Carbonate, Carbon, Iodoform, Tannin, Thymol Diiodide and Zinc Oxide.

Periods 20 through 30. The Pharmacodynamic Drugs Assays of the United States Pharmacopoeia.

3. THE MATERIAL REQUIRED FOR A COURSE IN EXPERIMENTAL PHARMACODYNAMICS AND THE COST OF THE SAME.

Each section or group of students, preferably not more than two although three or four may work in one group if absolutely necessary, should be provided with the following apparatus:

4 Small Cannulas, @ $0.14	$0.56	1 Simple Electric Key, @ $1.65	$1.65
1 Tracheal Cannula, @ $0.65	0.65	6 Aluminium Writing Levers	0.10
4 Artery Clamps, @ $0.55	2.20	1 Plethysmograph Tube, @ $0.30	0.30
1 Ergograph, @ $1.70	1.70	1 Iron Stand, @ $1.50	1.50
1 Inductorium, @ $10.00	10.00	1 Iron Stand with Adjusting Screw, @ $4.00	4.00
1 Kymograph, @ $32.00	32.00	1 All-glass Hypodermic Syringe	2.50
2 Heart Levers, @ $1.00	2.00	1 Sphygmomanometer	15.00
2 Muscle Levers, @ $1.35	2.70	2 Stopcocks, @ $0.85	1.70
1 Mercury Manometer, @ $3.00	3.00	1 Fishtail Burner, @ $0.25	0.25
1 Pneumograph, @ $3.10	3.10	1 Bell Jar, @ $1.00	1.00
1 Seeker, @ $0.75	0.75	1 Clinical Thermometer	1.00
1 Signal Magnet, @ $1.35	1.35	2 Rubber Catheters, @ $0.25	0.50
1 Marey Tambour, @ $1.50	1.50	1 Scalpel, @ $1.25	1.25
1 Sphygmograph Tambour	1.00	1 Surgical Scissors, @ $1.00	1.00
1 Tuning Fork, @ $1.00	1.00	1 Forceps, @ $0.40	.40
4 Double Clamps, @ $0.30	1.20	1 Enamel Pan, @ $1.50	1.50
1 Platinum Electrodes	1.95		

2 Burettes, @ $2.35	4.70	10 Double Hooks	0.15
1 Double Burette Clamp, @ $0.75	0.75	1 Moist Chamber	4.00
1 Large Iron Clamp, @ $0.35	0.35	1 Small Scale Pan	0.20
1 Animal Holder, @ $9.00	9.00	2 Dry Cells, @ $0.45	0.90
1 Piece Colophony Cement	0.05	10 Weights	0.12
1 Curved Jaw Clamp, @ $1.55	1.55	2 Hypodermic Needles	0.50
1 Flat Jaw Clamp @ $1.55	1.55	6 Wire T. T. Baskets, @ $0.45	2.70
1 Frog Board, @ $0.70	0.70	2 Woulff Bottles, @ $0.50	1.00
8 Frog Board Clips, @ $0.02	0.16		
		Total Cost	$128.69

In addition the following ordinary apparatus should also be provided:

4 Pieces Rubber Tubing, 12 in. long.
4 Small Glass Funnels.
1 Iron Ring Stand with rings.
5 Small Beakers.
2 Bank (Pithing) Pins.
8 Pieces Insulated Wire.
1 Minim Glass Graduate.
1 Four-Ounce Glass Graduate.
1 Stoddart's Clamp.
2 Evaporating Dishes.
1 Bunsen Burner and Tubing.
1 Small Glass Mortar and Pestle.
3 Florence Flasks (100, 250, 500).
2 Medicine Droppers.
24 Test-Tubes.
1 Test-Tube Rack.
1 Test-Tube Brush.
1 Spool Thread (coarse).
2 Needles.
1 One-Ounce Glass Graduate.
1 100-Mil Glass Cylinder.
2 Mohr's Clamps.
2 Glass Stirring Rods.
2 Watch Glasses.
1 Piece Wire Gauze.
1 Water Bath.

Prices for these are not given since the above apparatus is all found in the pharmaceutical school laboratories.

Other apparatus necessary for demonstrations and special work follows:

1 Anesthetic Bottle and Air Warmer	$25.00	1 Electric Clock, Harvard	31.00
1 Brodie's Respiratory Pump	57.00	2 Bone Cutting Forceps, @ $2.00	4.00
1 Animal Balance ($18.00) and Weights ($5.00)	23.00	1 Bone Saw, @ $3.00 (*in addition to other ordinary dissecting instruments*)	3.00
		Total	$143.00

A large galvanized iron tank should also be provided to be used as a constant temperature bath for frog methods of assaying. If funds are available a Brodie's Animal Table might be added; cost, about $85.00. Kymograph paper can be purchased for about seventy-five cents per hundred sheets. A long paper Kymograph would also be desirable as a part of the general laboratory equipment.

Dogs can be purchased for from $0.25 to $0.50 each. About forty dogs are required for the experiments outlined above. Guinea pigs can be bought for from $0.75 to $1.00. Two or three pigs are needed for each section in the laboratory work above. Frogs can be purchased for $10.00 a gross. Each section requires about two and a half dozen, not including those needed for the pharmacodynamic assays of the Pharmacopoeia. Rabbits cost from $0.75 to $1.00. About forty are required in the foregoing work. One toad for each section is also required. Considerable sums can be saved by raising the guinea pigs and the rabbits.

Although prices are fluctuating almost daily, the above figures will give the approximate cost of the materials required for this laboratory work. All of it can be used for giving laboratory instruction in the Department of Physiology as well. According to the above figures, then, we can total the cost as follows:

1. Cost of special physiological apparatus for each section or group of students..... $130.00
   (It should be noted that this does not include the ordinary apparatus also required, such as beakers, funnels, etc.)
2. Cost of additional apparatus for the general laboratory, to be used for demonstrations, etc..... 350.00
3. Cost of animals. (The figure that follows will doubtless be sufficient for providing enough animals for a class of fifty)..... 150.00

Many may look upon the cost of the materials that should be provided for each group of two students as rather high. It is true that this amount will be increased to about $150.00, when the cost of the ordinary apparatus, like beakers, funnels, etc., is added. However, when one takes into consideration the importance and value of the work, the fact that the apparatus can also be used by the Department of Physiology for laboratory instruction, and the fact that the apparatus with ordinary care will last indefinitely, the amount is not extremely high. The annual cost of up-keep is comparatively small. The cost of animals can be materially decreased by breeding them. Some medical schools require the students to furnish their own animals, or charge an additional fee for providing them with the necessary animals.

LABORATORIES OF PHARMACOLOGY,
SCHOOL OF MEDICINE,
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ATLANTA.

PHARMACY AND THE NEW EDUCATION.*

BY CHARLES O. LEE.

In the educational rôle of this country, pharmacy has not played a very conspicuous part. However, it has been only a little more than a generation ago since it began to be introduced into our colleges and universities as an integral part of such institutions. Its growth among the schools has been slow but certain. The requirements for entrance to and graduation from schools of pharmacy have gradually increased so that pharmaceutical education promises to be an educational factor of much greater moment in the future than it has been in the past. The teaching of pharmacy has not been thought of much as a problem in education probably because of its professional or technical character. The purpose of such training whether by schooling or by apprenticeship or by both is to fit a man to do certain peculiarly technical things. As in other courses of like nature the study of the subject had to follow certain prescribed courses and no one has ever changed the procedure very much.

Conditions have changed, however, and the signs of the times are that pharmacy must not be forgotten in the readjustment of the great educational upheaval which is upon us. Students of education and sociology tell us that we have suddenly come into a new democracy, and education must readjust itself to the demands of a contemporary civilization. If education means anything it must

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fit men and women to meet, adequately, new and changing conditions. Not only that, but each member of a democracy must be taught to feel and bear his definite responsibility to society. Education in a democracy such as ours must create in the individual a personal interest in social relationships and help to form habits of mind which will secure social changes without introducing disorder.

If this big problem of educational readjustment is to find a solution we must deal with some fundamental principles. If we are nearer the beginning than the end of a great period of transformation, as some one has said, the problem looms larger. We wonder if Josh Billings wasn't about right when he said, "tain't what men don't know that makes trouble in the world, it's what they know for certain that ain't so." It would not be hard for us to believe that much of the chaos and unrest in the world is based upon such a philosophy. If so, education is the cure. William James once said that the life of an infant is a "big, blooming, buzzing confusion." Swift[1] goes on to say, "that's what life always is, and education in its highest sense is only an attempt to bring a little order into this confusion and to classify it as far as available knowledge permits." Education, then, would involve thinking, comparison and interpretation, which would result in the elimination of a lot of non-essentials and ultimately bring contentment and satisfaction into life.

If the world is to be remolded educationally, pharmacy must not be left out as a contributing factor. This, then, will involve a brief reference to our theories of education and how pharmacy fits into them. The two commonly accepted theories of education are the utilitarian and the classical or philosophical. Those who adhere to the former theory believe that education's first purpose is to teach how to make a living. Followers of the latter theory pursue the so-called classical studies. They hold that the important things to insist upon are ideals, aspirations and correct habits of thinking. These theories are quite opposite. *Thinking* and *doing* are put one against each other. However, it cannot be implied that because a man has been taught to think a problem through he could always be trusted as a skilled artisan at a task, nor can it be assumed that a skilled workman thinks his job through, or by thinking makes his task more pleasant and more serviceable. While our educational policy in the past quarter of a century has swung greatly toward the vocational type of training, it is not without its inadequacies and dangers. The new democracy not only demands that a man perform a certain definite task for a pecuniary return, but it expects him to make himself a member of society—adding not only to his own well-being and happiness, but he must accord the same to others—he must not only receive but he must contribute.

Neither of these theories of education when carried to the extreme will solve our great national problems. There ought, then, to be a rational compromise between these two policies which would be better than either of them. It seems to me that our highest type of pharmaceutical education comes pretty nearly doing this. Certainly it combines splendid technical skill with a vast amount of information, not all of which is technical, but which requires and develops thinking. No good dispenser of medicines can be slovenly and thoughtless. There is every opportunity to improve upon technic. There is every reason why a pharmacist should feel that his tasks, even to the smallest, are a part of a great

service to humanity. This should make for interest, efficiency and pleasure, as not every trade or profession seems to do. We have not been philosophical enough about this work. Our courses are designed to fit the student to perform a peculiar scientific task. We forget that the pharmacist exercises his dexterity and skill only as it pertains to society. Such service might well be called professional, but it should be done with the proper attitude of mind. It is here that we must get beyond the utilitarian point of view. The highest compensation a man can receive is the complete satisfaction of real service rendered. Men trained in pharmacy are trained in technic. They learn the art of handling, compounding and dispensing of medicines but may not learn much of the humanities of life. We go on from year to year teaching pharmacy, chemistry and materia medica as something too much apart from real life. The physician links up his knowledge of chemistry with life processes. In the same way he makes use of his knowledge of materia medica and pharmacy. Why not bring such knowledge and skill into vital relation with life and society? The fact that we teach our students pharmacy in order to equip them to perform a certain kind of technical service cannot excuse us from helping to acquaint them with the world's business and social problems. To teach automatic routine laboratory exercises may increase skill but it does not necessarily lead to new perceptions. On the contrary, it tends to limit rather than widen the horizon of life. If is for this reason that purely vocational or technical training should turn back and link up with the more philosophical educational policies. There should surely be some connection, in the mind of the performer, between the performance of a task and the result, or else the whole thing will be a sort of a trick. The problem, then, is to relate every performance to every possible value and use. Education, then, is really freeing the capacity of the individual, progressively and in the direction of service to society. Something more than technical training is needed for this. The men who furnish the brains for big business have more than skill. They have vision, imagination and convictions, the prerequisites to progressive development. The president and manager of a large growing electric company is quoted as saying that "the fundamental limitation of the majority of men, from the standpoint of promotion, consists in a lack of capacity to adjust themselves to new requirements." He finds that men do not keep themselves fresh at the growing point. They do not anticipate or imagine the needs of a growing business and, as a consequence, the business grows more rapidly than the men in the business. Modern business cannot wait for men to qualify after promotion. Every growing man will be ready for the job that comes to him, by anticipation and prior preparation. If a man lacks resourcefulness and is not mentally flexible enough to meet the constantly changing conditions of a growing business, he soon ceases to progress and, in the end, fails.

The big problems of business and education are quite closely associated, and vitally so, since we look upon specialized training and mental discipline as means to a most complete success. Dewey[5] puts the situation quite well when he says, "an education which acknowledges the full intellectual and social meaning of a vocation would include instruction in the historic background of present conditions; training in science to give intelligence and initiative in dealing with materials and the agencies of production; and a study of economics, civics and politics to bring the problems of the day, and the various methods proposed for

its improvement into touch with the worker. This ideal has to contend with the inertia of existing educational traditions, and is opposed by those who use other ideals to further their own ends." Voorhees,[2] another authority, says "education consists in the strengthening of the powers of the body and mind by the process of body building, spirit building and institution building: that is, by the elevation of the health, of morals, and of the democratic and political institutions of the country." This author goes on to suggest that the three subjects which especially need to be taught in our schools are ethics, economics and politics. Ethics treats of conduct and service. Economics and politics not only treat of means of living independently but harmoniously as well. Snedden[3] states that "the modern world insists on specialization in productive activities as the keynote to efficiency; but it must learn to insist equally on the democratization and universalizing of fine consuming capacities, as a condition of maintaining the larger forms of social life." Modern society cannot call a man liberally or properly educated who manifestly professes no interest or concern in the exercise of any social responsibility, which is bound to fall upon every citizen, in proportion as he is qualified.

Educational procedure can no longer rest upon tradition. Past methods must go if they cannot be expanded into newer and larger ranges of activity and service. We quote again from Snedden,[3] "The demands of contemporary civilization for a more purposeful, a more comprehensive and a more efficient system of preparing the young for adult life are insistent and of increasing definiteness." Modern education has come to be thought of in terms of "social economy" in every sense of the word. This means the development of a social consciousness, prevention of disease, control of conditions which give rise to crime, suffering and waste of life; the promotion of civic idealism, economic efficiency and other qualities that are conducive to the highest well-being of every member of society.

In our technical courses we have always more or less rigidly prescribed a certain number of subjects which are considered absolutely necessary. Isn't this feudalistic and traditional? So much that we teach never functions in any practical way. However, the bane of education is trying to make everything practical. Here we are again trying to choose between humanitarianism and utilitarianism as educational policies. Neither alone seems adequate or sufficient, but if our students do not lack so much in skill and knowledge as in attitude, interest and experience, then these latter qualities should be cultivated. Nothing so unfits a man to become a part of the general scheme of things as does lack of interest, irresponsibility and mental slovenliness. Certainly not many people have too much mental equipment. The more of it a man has the more successfully and graciously will he encounter the struggles that a great big world of activity has to offer. We sometimes think that our educational doses are much like dispensing sugar-coated pills. They are already prepared, their disagreeableness is disguised, and the dose is small. But the medicine has been swallowed and the patient lives in the faith that it will produce mental, social and moral reactions. As long as we continue to hand out "as directed" courses to our students we can't blame them for having sugar-coated notions of life and service. In an autocracy we may expect to be told what to do, but in a democracy we must all do things and make the golden rule our motto.

We cannot separate education and democracy. Education is the foundation-stone of democracy. Our schools must not only prepare the individual to live but to live more abundantly, in every sense of the word. Since a democracy is a great community of mutual interests and responsibilities we agree with Allengry,[4] who says, "It is important, therefore, to constantly increase the intellectual capital of the nation, to train up citizens who will be above selfish considerations, to develop a political sense which will subordinate private interests to the general good, to engender a sense of duty, and to create great moral forces which are the sole guarantee against slavery and demagogism." The problem of education is much bigger than the individual and his trade or profession, it is as big as society itself. If the leading educators of the country are expecting the schools to make it a part of their business to develop a sincere moral intelligence, create a great national character and establish adequate standards of ethical ideals, we, who have the highest success for pharmacy at heart, must take cognizance of the situation. We may need to forsake the old way for the new, but progress in education means that it is dynamic and not static, that "Contentment is death" to pharmaceutical education as it is to every other field of education.

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PURDUE UNIVERSITY SCHOOL OF PHARMACY.

WHY CASTILE SOAP SHOULD BE DROPPED FROM THE PHARMACOPOEIA.*

BY E. V. KYSER.**

At the meeting of the American Pharmaceutical Association held in New York last year I presented a note "Proposed Changes in the Soaps of the Pharmacopoeia,"† suggesting that the definition of Soap in the Pharmacopoeia be changed so as to conform to the standards adopted by the United States Bureau of Standards. This would do away with the recognition of olive oil soap and would eliminate the use of the word "Castile soap" as a synonym for the official soap.

This proposal was referred to the Committee on Revision.

Since that time an importer of Castile soap has published an article on the subject in which he attempts to refute the arguments which I put forth in the paper referred to, and to create the impression in the mind of the reader that the retention of the present definition of Soap in the Pharmacopoeia was necessary

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† JOUR. A. PH. A., October 1919, p. 813.

to safeguard the interest of the public, and would protect them from the impositions of the American manufacturers.

I wish to present the subject again from a somewhat different point of view and to rehearse some of the arguments which seem to me quite sufficient to justify the Committee on Revision in adopting the standards for soap provided by the United States Bureau of Standards. The adoption by the Pharmacopoeia of an olive oil soap including its synonym Castile, would make it appear to the medical profession and to the general public that such a soap is not only superior to other soaps, but that it possesses some peculiar therapeutic value. This is in no way true; there is no difference in the therapeutic value of soaps, providing, of course, that the soaps have the same moisture content, are free from foreign matter and tendency toward decomposition.

With respect to their energy as germicides, soap solutions differ but little. All can be used as disinfectants in cases where they can be employed to advantage. The writer has recommended[1] that the Committee on the Revision of the Pharmacopoeia should replace the present *Sapo* with one made from a base of 80 percent prime tallow, and 20 percent Cochin grade cocoanut oil and that the proposed soap shall comply with the United States Government standards of purity as given by the Bureau of Standards for a milled soap made by the boiled process. Furthermore, the writer suggests that the requirements for *Sapo* be made more rigid and the methods of analysis be more explicit than at present. Such a soap is better suited, chemically and physically, for pharmaceutical requirements and general use, when economy, stability, chemical and physical superiority are to be considered.

Soaps are defined as metallic, alkaline or alkaline earth salts of fatty acids. We are interested here in the sodium or so-called hard soap. The manufacture of soap is a comparatively simple process, which no doubt had its inception in the household.

The devised method of making caustic soda by causticising sodium carbonate, derived from salt, by LeBlanc in 1871, and the invention of the ammonia soda process by Solvay, in 1863, were the prime factors in the development of commercial soap manufacture.

The processes of soap-making, with their limited variations, in use, are the "cold," "semi-boiled" and "boiled" processes.[2]

The cold process is merely mixing the fat and alkali while cold, until saponification is started. The heat evolved from the chemical reaction completes the saponification.

The semi-boiled method is a modified cold process using a higher temperature. Here the saponification is either effected in a kettle or mixer.

These two processes are open to the objection that foreign matter (contained in the fats or lye) is retained in the soap and, moreover, at times it is not possible to completely saponify the fat. Such soaps not infrequently contain free fat, or free alkali, or both. It will be readily understood that the action of the lye on the stock is necessarily less complete in this case (semi-boiled) than in the process of making soap by boiling; and, that the product will contain some uncombined ingredients besides all the impurities that may have been present in the stock and lye.[3]

In both of these processes, *viz.*, cold and semi-boiled, no separation of soap is effected, and the soap contains the glycerin and any impurities present in the oils. The saponification is also frequently incomplete.[4] Unlike the milled soaps made by the boiled process, these soaps all contain a very large percentage of water. The Pharmacopoeia allows 36 percent of water in bar Castile soap, and 10 percent in powdered. Soaps made from unsaturated glycerides and containing a large amount of water are deceptive to the buyer; by use, they waste away rapidly, become unsightly, decompose and are far from sweet-smelling.

Of these the boiled, also known as grained or settled process, is the only perfect method of completely saponifying the fats as well as separating the soap from the foreign or unsaponifiable matter, invariably found in fats and lye. Briefly, the boiling process consists of boiling the fat with alkali; adding salt until the soap is separated or rendered insoluble; and withdrawing the aqueous portion known as the waste lye. This operation is known as the stock change. The soap is again boiled with a strong solution of lye to insure complete saponification. A strong alkali acts the same as salt on the soap, and the aqueous solution of excess lye is withdrawn. This is known as the strong change. The soap, now ready for finishing, is boiled up with water and salt; then it is allowed to settle for two days. The clear soap rising to the top is completely saponified and free from alkali and foreign matter. This method is used exclusively in the manufacture of the finest grades of milled soaps for toilet and medicinal use. While this process is necessarily more expensive than the semi-boiled or cold processes, the finished soap warrants the expenditure. It is only by the various operations, made possible by boiling, that the glycerin formed in the course of saponification, the excess of lye, and numerous impurities contained in the fats and lye can be removed; the consequence of this is that well-boiled soaps—made neutral and freed from foreign matter—wash away less rapidly than do the cold-made, or half-boiled soaps, and do not become rancid in time by the presence of free fat.[5]

The oldest and probably still the best method of soap-making is the boiling process in which the fats are boiled together with alkali and the resulting soap is separated from most of the liquid which contains glycerol and impurities.[6]

The process of milling consists of passing the dried soap chips repeatedly through stone roller mills. The soap is thoroughly mixed, freed from excess moisture, made more compact, and its texture improved. Soaps of this kind constitute nearly ninety percent of all the soaps used for toilet and medicinal purposes. Soaps intended to be milled may be made by either the cold or the semi-boiled process, but for the best results, *viz.*, perfect saponification, neutrality and purity, the grained settled process is best. Only the best stock available is used for a milled soap base.[7] Of all the soaps made, those prepared by "milling" are the best in many respects. In point of intrinsic merit as a soap they are preferred because they contain the least possible amount of water, and are usually made from the best of materials, and with the greatest of care; besides, every well-made soap is improved by repeatedly re-working it. They are also more lasting in use because their small proportion of moisture and their dense texture make them waste away less quickly. In appearance also, which is not an unimportant item in a toilet soap, they are beyond comparison, for the process by which they

are manufactured gives them a high finish and preserves them from shrinking, no matter how long they are kept.[8]

Chemically there is no material difference between oils and fats used in soap-making; both classes as we know them are mixed glyceryl esters of fatty acids. For convenience, the word fat will be used, in reference to oils and fats. The largest number of fats contain: olein, palmitin, and stearin in varying amounts, whereas olein, palmitin, or stearin are present in all fats in some proportion. Fats containing a large percentage of the saturated glycerides, stearin, and palmitin, *viz.*, tallow, palm oil and cocoa butter, are solids at ordinary temperature, whereas fats composed of a greater percentage of the partially or completely unsaturated glycerides, olein, linolin, and linolinin, *viz.*, olive, corn, soya, peanut, linseed, are liquids at ordinary temperature.

The three methods of obtaining fats are, rendering, expression and extraction:

Rendering, which is extensively used for fats of animal origin, may be effected by open fire heating or carried on in closed vessels, using live or dry steam. In both methods, the fat capsules are expanded by the heat until they are ruptured, allowing the liberated fat to run off and be settled.

Expression, either cold or hot, is used almost entirely in producing vegetable fats.

Extraction, wh'ch produces a larger yield of fat, was formerly not used to any extent except in the recovery of off-grade fats. This method with the improved facilities for the recovery of the solvent, thereby leaving the oil and the cake in an edible state, is becoming very popular, and, by its economy and ease of operation, will most likely supplant other methods. To produce the best fats by this method, the material to be extracted should be in a fresh state, as the solvents used have a tendency to extract any products of decomposition and coloring matter present.

Olive oil is obtained from the fleshy part of the fruit of *Olea Europoea*. The Pharmacopoeia directs that it be made from ripe olives. The best oils are obtained from the olives just before maturity; the yield is not as large, but the quality of the oil is superior to that from the mature or ripe fruit. The olive tree is indigenous to western Asia, and has been transplanted into all of the countries bordering on the Mediterranean, as well as South Africa, Australia and California. The quality of the oil depends on the variety of the tree, the time and method of gathering, and the method of making. There are some three thousand varieties of trees in Italy alone, each producing its characteristic oil. At the harvest time there is such an abundance of olives that it is not possible to express all, while fresh. This necessitated storage in different ways, among these are salting, submersion in cold water, and keeping in dry, well-ventilated houses. Olives decompose readily, and consequently, if kept for any length of time, generally produce oils of high acid value and rancidity.

It is generally believed that Castile soaps are made from the high-grade oils. This is a mistaken idea, for Castile soaps are made from the oils that are not fit for edible use. The oil from the first cold expression is the edible or virgin oil. The second cold expression produces the salad oils, which are sold as edible, or else mixed with the edible oils. After the cold expressions, the cake is removed,

treated with hot water, and again expressed, either once or twice, producing the bright oils, known as Commercial Grade, which are used for lubricating, burning and some soap-making. The repeatedly pressed cake contains a further amount of oil and consequently it is removed and treated in a special water mill, whereby the cells are broken up. The mass is run into tierces, the oil and tissue rising to the top is skimmed off and expressed. The oil here obtained is settled; the lighter portion is known as *huile claire de ressence*, the lower layer of heavy oil "olive grease." These oils are high in acid, oxidized and contain lactones.

In some instances the marc or cake, after several expressions, is thrown into pits and allowed to ferment, after which it is treated with hot water and expressed. The "bagassa oils," which are obtained in this manner, are high in acids and oxidized. When all of the oil is obtained by the process described, the pulp is extracted with carbon disulphide, hence the sulpho-carbon oils which are green in color, due to the extraction of chlorophyl, are highly contaminated with organic impurities. The lower quality oils are used in the arts, as burning oils, lubricating oils, wool and soap oils. For textile soaps (as also for household soaps in the south of Europe) the highly acid bagassa oils, olive oil grease, and sulphur oils are used. High-class medicinal soaps are chiefly made from the best commercial oils. Olive grease and sulphur oils are used for the marbled Castile and the green Marseilles Castile.[9] Castile soap, otherwise known as Marseilles or Venetian soap, is prepared from low-grade olive oils.[10] A soap made from any of the enumerated oils can be called Castile, which is the adopted synonym for *Sapo* by the Pharmacopoeia, and sold as such to the laity with immunity, because these soaps are made from caustic soda and olive oil. If the Pharmacopoeia is to retain this inferior soap, it should at least protect the users by a more specific analysis for purity. The present analysis is totally inadequate inasmuch as other soaps made from similar oils could replace olive oil, and respond to and comply with the present specifications. The Pharmacopoeia states that 0.67 Gm. of soap dissolved in 25 Cc. of alcohol should not gelatinize when cooled to 20° C. This is given as a test for soaps from animal fats. This test would indicate that soaps made from palm oil,

Oil.	Sp. gr. 15° C.	Sapon. value. Mg. KOH.	Iodine No. Percent.	Titer test fatty acid.	Insoluble organic.	% liquid solid acid.
Olive.....	0.9–0.916	185–203	78–94	18.9–26.4° C.	0.46–1.42	Solid acid 5–17. Liquid acid oleic
Olive Kernel..	0.9184–0.9191	182.3–183.8	86.9–87.8	.....	.....	
Almond.....	0.918–0.919	189.5–191.7	93–101.2	.....	.....	
Archidic Peanut.....	0.913–0.917	185.6–196	83.3–95.4	28.1–29.2	0.2–0.79	Solid acid 5 Liquid oleic and linoleic
Cottonseed....	0.925–0.925	191–194	100–120	28–35	.....	Solid 20–25 Liquid oleic Linoleic
Lard.....	0.916	189–193	67.88	19–23	.....	Solid 5 Liquid oleic
Tallow.....	0.943	143–198	35–40	43–44	0.2–0.3	Solid palmitic stearic Liquid oleic
Cocoanut.....	0.930	250–260	9.3	21–25	.....	

Japanese vegetable tallow, or hydrogenated oils, including olive, do contain animal fats. There is no test for benzol-soluble unsaponified matter, with saponifiable, free fat, or for the unsaponifiable organic impurities. The iodine number is the only test which would in any way indicate the origin of the soap and here we have other vegetable as well as animal fats, whose iodine numbers are between 84 and 90.

Chemically, olive oil is a non-drying oil. In this class are almond, peanut, olive kernel, and many others of lesser importance. For comparison, lard oil, cottonseed oil, cocoanut oil and tallow are included in this chart.

From the above chart it can be seen that the chemical composition of the unsaturated oil does not vary greatly, with the exception of cocoanut oil, which is nearly a saturated oil. The most striking similarity is the chemical composition and the constants of olive and lard oils. Therefore it can readily be understood that soaps made from any of these oils would be chemically the same and would exhibit the same physical and therapeutic properties.

None of these oils, when used alone, are chemically or physically suited for the manufacture of soaps for the toilet or medicinal use. They are susceptible to oxidation as evidenced by their iodine numbers, and consequently become rancid, ill smelling and unsightly.

The writer has recently had occasion to examine a number of Castile soaps and he finds these conditions to be generally evident. A most striking incident of rapid decomposition was manifest in a well-made imported "white Castile." This soap, protected by a waxed paper and a tinfoil wrapper, was exposed to the air for sixty days. At the expiration of this time, the soap had lost 25 per cent in weight (water), was of a dirty brown color, and had developed a very offensive odor of decomposition.

Castile soaps, while they do not lather very well, waste more rapidly than do soaps made from a tallow and cocoanut oil base. The percentage of water present, the method of manufacture, and the large amount of sodium oleate, all contribute to these objectionable characteristics.

The true Castile soap, as may be readily expected, becomes very hard with age, and forms a slimy mixture with water, rather than a lather.[11] Castile soap may be imitated by the use of peanut oil, cottonseed oil and light red oil. Tallow may be used in varying amounts up to the degree that the characteristic slimy lather of soap made from olive stock is not destroyed.[12]

Soaps made from fats containing a large amount of olein are of a softer body and more readily soluble in cold water than soaps of a firmer stock, *viz.*, tallow. Unbleached olive foots yield a green soap, but this color sometimes changes to a dirty brown. In warm weather this soap softens considerably and washes away very rapidly.[13] A large amount of water present causes the soap to be used up very rapidly.[14] There is required, for the proper formation of soap, a certain percentage of water which enables the particles of soap to form a compact and yet readily soluble mass. Other things being equal, the soap is more easily soluble, and thereby more rapidly effective, in the proportion that it contains a greater percentage of water. This proportion, of course, must be within reasonable limits in the product to be marketed, as an excessive amount would be in the nature of a deception from the purchaser's standpoint, besides the subsequent evaporation renders the soap unsightly and too light in weight. Freshly made soap washes

quickly, but is apt to waste away in consequence of its greater solubility on which this rapid action depends. The amount of water contained in commercial hard soaps including that only admixed and that bound chemically, varies greatly, say from 10 to 12 percent to 35 or 40 percent.[15]

SUMMARY.

Castile soap, even if made from the best grade edible olive oil (which it is not), does not possess any peculiar therapeutic value. Soaps made from any fat containing a large percentage of unsaturated glycerides, *viz.*, lard, olive, soya bean, cottonseed, peanut, linseed or even red oil, will exhibit the same physical and chemical properties and therapeutic effect.

The method of manufacture used for Castile soap is open to the objection of incomplete saponification, the retention of impurities and a large percentage of water.

Castile soap is not a good detergent, does not lather well, and is deceptive because it contains from 25 to 36 percent of moisture and is not made from U. S. P. olive oils.

Soaps made from other oils than olive oil will comply with the analytical tests of the Pharmacopoeia and will function the same as olive oil soaps. Castile soap is not economical to use; it wastes away rapidly—due to its high moisture content, its composition, as well as the method of manufacture.

If soap be made from the materials by the method of manufacture herein proposed, the resultant soap will be the best obtainable soap for any use, whether it be medicinal or domestic.

Such a soap as proposed is absolutely pure, mild, emollient, free from unsaponified fat, alkali or foreign matter, and is permanent.

It possesses better lathering properties than does Castile soap, is an effective detergent, and more economical in use.

Moreover, if the standards which I have proposed be adopted in the Pharmacopoeia, the soap can be made by American manufacturers from American raw material by the standardized American process. The resulting soap will be a purer, better and more economical soap than is Castile soap. As a matter of fact, the question has been raised whether soap should be recognized at all in the Pharmacopoeia. The Department of Agriculture does not appear to consider Castile soap as being a medicinal article, since it has not made any wide-spread campaign of prosecution against manufacturers, who have marketed soap under this name, which did not conform to the Pharmacopoeial requirements.

Some State authorities, however, have undertaken such prosecutions and, in one instance at least, the charges were dismissed by the court on the ground that the substance was not a "medicinal substance," but was a toilet preparation, and that it was not in the province of the Drug Act to supervise its composition.

I have no sympathy with those who sell as Castile soap any soap other than that made from olive oil. I think that the term "Castile Soap" should be used solely as a descriptive term applied to olive oil soap, but I am strongly of the opinion that the retention of the term "Castile Soap" in the Pharmacopoeia, and the directions to use olive oil soap, would be a grave mistake both from a commercial and from a scientific standpoint, as both the medical profession and the general public would assume, as it has been assumed in the past, that because a particular soap was recognized in the Pharmacopoeia it was the best soap, whereas on account of the peculiar physical qualities of Castile soap and of the method of its preparation it is not the best soap for general use, nor has it any special, physical or therapeutic value; but, on the other hand, it is apt to have an excess of water and may contain impurities which are not excluded by pharmacopoeial tests.

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SUGGESTIONS TO THE U. S. P. REVISION COMMITTEE.*

BY WILLIAM GRAY.

SAPO MOLLIS.

Soft Soap should be made from corn oil because all large soap-makers use this product. Experience has taught them that soap made from corn oil has a better appearance; is more stable than that made from cottonseed oil. The latter requires more alkali for saponification, becomes rancid quickly, if neutral, also discolors readily; so why not use the article professional soap-makers find to be the best, as most druggists do not make the soap? They either buy the corn oil product, or pay a premium for the cottonseed oil soap—a product, manufacturers inform me, they do not care to make, for reasons stated above. I might add, if there is a desire for economy, the best way would be to leave it open to use any vegetable oil, for example, peanut, soy bean, linseed, etc. There is a very great fluctuation in price of oils throughout the year; this would allow the soap-maker to use the cheapest at time of manufacture, thereby reducing the cost to purchaser.

LIQUOR CRESOLIS COMPOSITUS.

The Compound Solution of Cresol formula should be simplified so that the average pharmacist will take the trouble to make this preparation. This could be accomplished by using equal parts by weight of cresol and soft soap. The pharmacist would be surer of perfect saponification than is the case with the present formula, because both oil and alkali will vary; the alkali in anhydrous properties, requiring titration or the use of hydrometer; the oil in saponification value, due to age or source. Would it not be a great advantage to the pharmacist to use a previously made soap?

UNGUENTUM ZINCI OXIDI.

The present formula for Zinc Oxide Ointment is not generally desired, so far as I have been able to observe, because often it will be found rancid. Generally speaking, zinc oxide ointment is used as a protective—why not use petrolatum as the base? It is common practice, so let us make it official:

* Read before Section on Practical Pharmacy and Dispensing, A. Ph. A., City of Washington meeting, 1920.

DEXTROSE (GLUCOSE).

Glucose, of the Pharmacopoeia, is to my mind simply corn syrup—a mixture of dextrose 35 percent, dextrin 45 percent and water 20 percent. I understand glucose, grape sugar and dextrose are synonymous and, therefore, mean just sugar without dextrin or water. C. P. dextrose is described as anhydrous and white in color. The commercial variety, sometimes called cerelose, is about 96 percent anhydrous. Both are used extensively in hospitals for enemata and feeding purposes, as well as for intravenous and hypodermatic use. Dextrose is being used increasingly for all conditions of acidosis, and for several functional tests. It is particularly indicated in diabetic coma. I would like to see both C. P. and commercial in the next Pharmacopoeia; it will land there eventually, so why not now?

WHISKY, BRANDY, GIN AND RUM.

Whisky, Brandy, Gin and Rum are *narcotic* stimulants, and as such should be handled, if at all, by pharmacists in the same manner as other narcotics, and not by irresponsible persons, as was the case before the Prohibition Act went into effect. Now is our chance to keep these drugs where they belong. I can see no valid reason why they should not be incorporated in the Pharmacopoeia. Some will question their medicinal value, but is that not the case with about 75 percent of U. S. P. and N. F. preparations?—take tincture of gelsemium as an example. I understand it is very rarely prescribed in the North, while in the South it is very commonly used, if not indispensable. I am not trying to defend strong alcoholic liquors, personally I have no use for them, but that has nothing to do with the case. There are plenty of physicians who believe in these narcotic stimulants. If we are in the prescription business, it is up to us to supply physicians' orders without any ifs or ands about it. There can be no odium attached to this, as it will be only prescription business, not at all like a bar where patrons drink on the premises. Government restrictions, which are on a par with those governing the sale of morphine, cocaine, etc., take care of that. Over twelve hundred druggists in Chicago have taken out licenses. Many claim that prohibitionists want the pharmacist to handle this business. So let us have whisky, brandy, gin and rum standardized as drugs—by so doing we may possibly forestall their return to the beverage class.

LIQUOR CALCIS CHLORINATAE.

A solution containing 15 percent chlorinated lime would be a valuable addition to the Pharmacopoeia for this reason: it could be used as a basis for making either eusol or Dakin's solution. By standardizing this solution to 4.5 percent available chlorine, one would simply dilute 1 in 10 to make the above solutions, using boric acid in the case of eusol, sodium carbonate and bicarbonate of, for Dakin's; in the latter case it would of course be necessary to decant or filter. As to the stability of a solution of chlorinated lime, I will refer you to a report of the Research Committee of the Department of Pathology, University of Edinburgh, *British Medical Journal*, September 22, 1917, page 386, wherein it is stated that a sample of Liquor Calcis Chlorinatae B. P. which assayed when prepared in April 1915 2.92 per cent chlorine was kept in a clear glass-stoppered bottle in a cupboard in the laboratory for over two years. Later, on the last day of July 1917, this solu-

tion assayed 2.62 percent chlorine. From the above information this solution is evidently stable enough to be constituted a concentrated solution from which to make the other hypochlorite solutions.

SOME PHARMACEUTICAL PREPARATIONS.*

BY H. M. FASER.

The first preparation I wish to discuss is the much used, and one time official, Elixir of Iron, Quinine and Strychnine Phosphates. Just why a formula is not given in the National Formulary for this Elixir I have never been able to understand. I am aware of the fact that the formula of the U. S. P. VIII was not satisfactory and deleted on that account, but at the same time manufacturers of pharmaceuticals make this elixir and sell it to the drug trade in large quantities. If manufacturers can devise a formula that will stand up under ordinary conditions, surely some member of the American Pharmaceutical Association can devise a formula suitable for admission to the National Formulary. In the section of the country from which I come large quantities of this elixir are used and I have made it for a long time. The formula which I use is one that has been published many times, and I think came originally from Mr. Beringer. I am quite sure that most of you have seen this formula, but for fear some of you have not, I give it here:

ELIXIR OF IRON, QUININE AND STRYCHNINE PHOSPHATES.[1]

Soluble Ferric Phosphate	17.50
Potassium Citrate	5.00
Quinine	8.75
Strychnine	0.275
Phosphoric Acid	2.00
Alcohol	200.00
Glycerin	200.00
Compound Spirit Orange	10.00
Purified Talc	30.00
Distilled Water to make	1000.00

Dissolve the quinine and the strychnine in the alcohol and 100 mils of water to which has been added the phosphoric acid. Add to this the compound spirit of orange. Dissolve the soluble ferric phosphate and the potassium citrate in 100 mils of warm water and add the glycerin, then the solution of the alkaloids and sufficient water to make the product measure 1000 mils. Mix the talc with the liquid and filter, returning the first portion until a clear liquid is obtained. Lastly wash the filter with a mixture of one volume of alcohol and four volumes of water until the filtered product measures 1000 mils.

It seems to me that Elixir of Iron, Quinine and Strychnine Phosphates should be in the National Formulary, and I do not believe improvement on this formula can be made.

Elixir of Lactated Pepsin is largely prescribed, and is bought by many in

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* Read before Section on Practical Pharmacy and Dispensing, A. Ph. A., City of Washington meeting, 1920.

[1] A year-old sample was shown which had been kept in a dark place, but in a flint glass bottle. The author stated the elixir should be kept in an amber glass container and dispensed in an amber bottle.

five-gallon quantities, and made by some pharmacists. Its use is largely that of a vehicle. The average pharmacist can devise a formula for this elixir, but some cannot, therefore a formula should be in the National Formulary for it. The formula I have used for many years is as follows:

ELIXIR OF LACTATED PEPSIN.

Pepsin (scales)	30.00
Lactic Acid	1.00
Hydrochloric Acid	2.00
Glycerin	250.00
Alcohol	200.00
Oil Orange	2.00
Cudbear	1.00
Talc, sufficient Distilled Water to make	1000.00

Mix according to art.

This makes a nice preparation and one that has given entire satisfaction in my business.

The third elixir I wish to speak of is Elixir Saw Palmetto and Santal Compound. This is another preparation that to my mind should be listed in the National Formulary. The use of it, I think, is pretty nearly universal, and the making of it is very simple indeed.

The formula I use is as follows:

ELIXIR SAW PALMETTO AND SANTAL COMPOUND.

Fluidextract Saw Palmetto	125.00
Fluidextract Corn Silk	125.00
Oil Santal	4.00
Oil Orange	0.50
Alcohol	180.00
Glycerin	180.00
Purified Talc	15.00
Distilled Water to make	1000.00

Dissolve the oils in the alcohol and add the mixed fluidextracts, glycerin and water. Allow to stand for several days and filter.

We have a long list of elixirs in the National Formulary, many of which, to my mind, could easily be dispensed with. However, in this I may be mistaken, because I am familiar with conditions only in my part of the country, but using the section from which I come as a guide, the three elixirs I have mentioned certainly deserve a place in the National Formulary. The formulas I have given may not be any better than some others, probably not as good as some, but the point I wish to make is that formulas should be included for these preparations.

Now leaving elixirs, I wish to say a word about a preparation of the National Formulary which I think could be very easily improved upon. The preparation to which I refer is Liquor Antisepticus. As far as medicinal properties go, it is probably fairly good, but being colorless is certainly a drawback. I would suggest the addition to the formula of 2.5 grammes of powdered hydrastis,[1] which not only gives a beautiful color, but improves the preparation as a mouth wash and gargle.

[1] A sample made with the addition of hydrastis was shown.

SURGICAL DRESSINGS.*

BY ELMER H. HESSLER.

Surgical dressings had their birth at the time when Lister gave to the world his discovery of antisepsis. The era of Listerism completely revolutionized the method of treating wounds and the practice of surgery. The pharmacist has always been called upon to furnish the surgeon with the proper material for practicing his profession and, naturally, the pharmacist was also called upon to furnish materials required when this revolution in surgical treatment took place. Since the time of Lister, rapid strides have been made in the practical carrying out of his theory both in the technic and materials employed. Pharmacists, as a rule, have not bothered themselves about the actual preparation of the items used. Perhaps it would have been better for them, both from a professional and a business standpoint, if they had. On account of the failure of pharmacists to prepare these surgical materials and also, perhaps, on account of the inability to manufacture economically in a small way, the manufacture of surgical dressings has been developed almost entirely by the larger manufacturers.

The raw materials employed in the manufacture of surgical dressings are numerous. The most common materials used are cotton, paper, felt, wool, lint, oakum, linen, silk, rubber and paraffin.

There must be certain standards for these items, and there have been numerous attempts made at standardizing raw materials for surgical dressings. The United States Pharmacopoeia, Ninth Decennial Revision, has specified the standard of purity for absorbent cotton. The description of purified cotton in the U. S. P. is as follows:—"X X occurs as white, soft fine filaments, appearing under the microscope as hollow, flattened and twisted bands, spirally striate, with slightly thickened edges, inodorous and almost tasteless, insoluble in ordinary solvents but soluble in an ammonia solution of cupric oxide." A limit of 0.2% of ash is established, as well as a limit for alkali or acid, fatty matter, resins and soap. In other words, the Pharmacopoeial standard describes pure cellulose fiber derived from the *Gossypium* genus. This is the ideal requirement for surgical purposes, and cotton that does not meet these requirements is not satisfactory for all purposes. There are cases, however, when non-absorbent cotton is used for certain purposes but in such cases this variety is definitely specified. Cotton is the basis of a large number of surgical dressings; among these are surgical gauze, the facing for plasters, tampons, towels, bandages, sanitary napkins, etc.

Surgical gauze is woven in practically the same manner as any other cotton cloth, only that specially selected yarns are used in the process, and that in the process of finishing, the cloth is purified by acid and alkali treatment, bleaching and final extraction of all foreign matter so as to leave the finished product in very much the same chemical condition as absorbent cotton. A number of standards have been suggested taking advantage of both the physical and chemical properties of the gauze. The physical properties which serve as a basis for standardization are the microscopical appearance, the weight per square foot, the number of threads per square inch, the number of times its own weight of water it

* Read before Section on Practical Pharmacy and Dispensing, A. Ph. A., City of Washington meeting, 1920.

will absorb and the length of time necessary to absorb a given weight of water. Color and general appearance are also considered. The chemical properties which serve as a basis of standardization are the limit of ash, the composition of the ash, and the composition of extractive obtained by various solvents. All surgical gauze should be free from any sizing or filler such as are used in ordinary textiles. Surgical gauze may be impregnated with certain medications and sold as such in convenient packages. The popular medications are phenol, corrosive sublimate, boric acid, picric acid, thymol iodide, double cyanide and chloramin T. The medications are made by saturating the gauze with a solution of the medicament in a proper solvent. The strength of the solution is so calculated as to leave the gauze impregnated with the desired percentage of medication. A complete description of the manufacture of gauze would be simply the story of manufacturing textiles of any kind and, in this paper, is not deemed necessary. The various grades of surgical gauze base their classification on the number of threads per square inch. The grades vary from 48 threads per inch lengthwise and 44 threads per inch crosswise to 20 threads per inch lengthwise to 12 threads per inch crosswise.

The most popular grades are:

48 x 44 threads to inch.
44 x 40 threads to inch.
32 x 28 threads to inch.
28 x 24 threads to inch.
24 x 20 threads to inch.
20 x 16 threads to inch.
20 x 12 threads to inch.

The higher grades of gauze are used largely in the manufacture of bandages and handkerchiefs, while those of more open mesh are used for surgical purposes. Recently, lace mesh made of cotton fiber has been impregnated with paraffin and used as a surgical dressing which is non-absorbent and non-adherent. This variety of surgical dressing has a distinct advantage, in acting as a drainage medium, and also permits the redressing of a wound without causing bleeding. Bandages are usually made from surgical gauze of the 48 x 44 or 44 x 40 threads to an inch. There are a number of styles of bandages, such as gauze bandages, muslin bandages, canton flannel bandages, black muslin bandages and triangular bandages. Gauze bandages have the widest application, but the other styles have a limited application for special work.

Paper which has been purified to an extreme degree has recently been introduced as a substitute for cotton, for absorbent purposes and also as a substitute for bandages. The substitution of this paper for cotton has been very successful where absorption alone is desired. The substitution of paper bandages for gauze bandages has not met with as much success on account of the inability to use them with moist dressings.

Felt is employed as a surgical dressing, in a very limited amount, for pads used in alleviating pressure.

Wool of a high degree of purity, usually lamb's wool, is used in making tampons, because it possesses the advantage of absorbing medications intended for local use.

Lint is a variety of cotton cloth, used to apply ointments or similar preparations to open wounds or irritated surfaces.

Linen is employed in the better grades of surgeons' towels and is an ideal material for this purpose.

Silk is employed for isinglass plasters, and also as a material for oiled silk. Oiled muslin is a cheap substitute for oiled silk. Oiled paper has also been recommended as a substitute for oiled silk although it is not as desirable a substitute as oiled muslin.

A description of surgical dressings would not be complete without calling attention to ligatures, splints and the various special dressings. Ligatures are made from a number of different materials—foremost being catgut, kangaroo tendons, horsehair, silk and silkwormgut. Allied with ligatures, although not strictly identical, would come umbilical tape, which is usually made of mercerized cloth of great tensile strength. Splints are usually made of wood, wire, or pressed metal. They do not strictly come under the head of surgical dressings, and should be classed with surgical instruments. Among the special dressings are—Umbilical Dressings, Burn Dressings, Finger Dressings, Packing Strips, Sanitary Napkins, Emergency Dressings, Bed Pads, Gauze Mops, Gauze Sponges, Gauze Pads, Gauze Handkerchiefs. All of these special dressings are made of surgical gauze—medicated or plain—combined with absorbent cotton and similar substances, and designed to meet the particular need for which the dressings are designated.

All the surgical dressings mentioned would be absolutely worthless, and it would be criminal to sell them, if they were not rendered sterile; chemical and physical standards would have little value if the dressings were not subjected to some form of sterilization. It is with the sterilization of the dressings that the surgeon is much more interested than in the chemical and physical standards. Sterilization may be carried on in a number of different ways, but the method mostly employed is sterilization for an extended period with superheated steam. The United States Pharmacopoeia, Ninth Decennial Revision, under the topic of sterilization, has the following note concerning surgical dressings.

"Cotton, bandages, gauze, ligatures, etc., may be rendered sterile by treatment with steam in a pressure apparatus (autoclave) at 115° C. for 15 minutes, or by exposure to dry heat in an ordinary air bath or sterilizer at the temperature of 160° to 170° C. for 2 hours. It should be remembered that all surgical materials are not amenable to such thorough treatment without more or less deterioration taking place. Bandages must be folded or packed in such a manner as to permit penetration of steam or dry heat during the process and should be so arranged that after the sterilization is complete all subsequent contamination with the bacteria will be prevented. This is usually accomplished by immediately enclosing them in glass containers or wrapping them in a number of thicknesses of previously sterilized parchment paper."

This is the usual procedure in sterilizing surgical dressings and all modifications are simply to take care of the chemical properties of the various chemical substances entering into the dressings. Such chemical substances as do not permit sterilization at the temperature designated may be sterilized by the application of moist air laden with the fumes of formaldehyde. Sterilizing in an autoclave is usually done by creating a partial vacuum and then admitting the superheated steam or the formaldehyde-laden moist air. This enables the sterilizing medium to penetrate to the very pores of the surgical dressing and render the sterilization thorough.

THE MCNEIL LABORATORIES, PHILADELPHIA.

ABSTRACT OF DISCUSSION.

Lyman F. Kebler referred to some investigations, not yet completed, on surgical dressings. D. F. Jones suggested the use of the Denver Steam Cooker as a sterilizer for small quantities of dressings, and J. Leon Lascoff stated that it was a very serviceable part of the drug store equipment.

DISINFECTION SOLUTION (SPECIAL APPLICATION).*

BY L. E. SAYRE AND F. A. PATTY.

During the fearful period of the influenza epidemic the almost terror-stricken inhabitants of nearly every community were asking the authorities connected with boards of health for protection from every possible source of infection. It is needless to say that these authorities, while doing their utmost, were groping in the dark to locate the source or sources of contagion. They centered their efforts upon processes of purification and disinfection in every imaginable place where a possibility of a spread of the disease was suspected. One of the places under suspicion was the soda fountain. It was reported that in not a few places there was carelessness displayed in washing soda water glasses. In Kansas, a ruling was made that glasses should be washed in water at or near the boiling point. Many of the enterprising pharmacists installed sterilization schemes such as running hot water; others used live steam; and still others installed expensive apparatus for complete sterilization. Of course, such methods could not be used in the majority of small places where soda trade did not warrant the expenditure. The result was that in many of the small towns, stores discontinued their fountain business.

Dr. S. J. Crumbine, secretary of the Board of Health, and F. E. Rowland, assistant chief of inspection, asked for the preparation of a solution, if possible, that would be a harmless but reliable disinfectant for washing soda glasses—a solution that would stand a fairly severe test and one that any ordinary druggist could make himself. The off-hand remark to these officials was that a sodium hypochlorite solution would most likely meet the requirements they had in mind, but they urged that they would be glad to have any statement verified and substituted by experimental data.

Laboratory experiments to cover the situation were accordingly designed and carried out. This was accomplished by first procuring cultures of three organisms, one a culture of *micrococcus aureus*, an organism which produces boils and abscesses and is found abundantly in the mouth and throat. It is relatively easy to kill. Another, a culture of typhoid bacillus, the bacteria causing typhoid fever; and last, a culture of *streptococcus pyogenes*, which causes sore throat and various skin eruptions. This organism is very resistant and difficult to kill with ordinary disinfectants.

Broth cultures of these organisms were prepared and incubated 24 hours at body heat to obtain a luxuriant growth, then poured into glasses, previously sterilized in an autoclave. The glasses were drained, one at a time, dipped into a disinfectant bath and removed immediately. Each glass was next rinsed with sterile broth and a portion of the broth streaked on agar and incubated at body

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* Scientific Section, A. Ph. A., City of Washington meeting, 1920.

temperature to ascertain whether or not the organism had been killed by the disinfectant bath.

The time element in this way is reduced to a minimum, but so would it be in actual practice. Many solutions can be prepared, which will be good disinfectants if allowed to remain in contact for some time and at a temperature somewhat above room temperature (72° F.).

Tabulation of experiments with various solutions, together with results obtained, are herewith subjoined. It may be of interest to note here that results obtained from some solutions were somewhat surprising, as will be indicated.

The calcium hypochlorite solution employed was made by triturating bleaching powder with water and straining the mixture. The sodium hypochlorite solution used is best made as directed in making Solution No. 1.

The formula for the disinfecting bath is given below, for convenience, in both the Apothecaries and Metric Systems.

FORMULA IN APOTHECARIES SYSTEM.

Solution No. 1.—Triturate 12 ounces (one can) bleaching powder to a smooth paste in 20 fluidounces of water and wash the mixture into a large flask or bottle (about one gallon) with 14 fluidounces of water. Add 8.4 ounces pure sodium carbonate dissolved in 17 fluidounces of hot water. Shake the contents thoroughly; if it becomes gelatinous, warm gently. Transfer the whole to a wet muslin strainer in a large funnel and return the first portion which comes through until the liquid is clear. Drain and wash with small successive portions of water sufficient amount to make 50 fluidounces.

Use four fluidounces to each three gallons (1.3 fluidounces to a gallon) of the disinfectant bath.

Solution No. 2.—Measure exactly 3 fluidounces C. P. hydrochloric acid (sp. gr., 1.17) into a container graduated for 32 fluidounces, and add enough water to make 32 fluidounces.

Use 1 fluidounce Solution No. 2 to each gallon of the disinfectant bath in its final preparation for use.

FORMULA IN METRIC SYSTEM.

Solution No. 1.—Triturate 200 grammes bleaching powder to a smooth paste, using water, and wash into 2-liter flask with 200 Cc. water. Add 140 grammes pure sodium carbonate dissolved in 250 Cc. hot water. Shake thoroughly; if contents become gelatinous, warm. Transfer to a wetted muslin strainer in a funnel and return first portion of filtrate until it comes through clear. Drain and wash with small successive portions of water to make 1000 grammes of the solution.

Use 10 Cc. of solution of No. 1 to make 1 liter disinfectant bath.

Solution No. 2.—Measure exactly 69 Cc. C. P. hydrochloric acid (sp. gr., 1.17) into a liter flask and make up to a liter with distilled water.

Use 10 Cc. to each liter disinfectant bath in final preparation for use.

Precautions.—All weights and measurements must be made *exact* for maximum results. Distilled water must be used in making solutions 1 and 2 and preferably but not necessarily in making the final bath. The bleaching powder must have at least 30% available chlorine present. The most favorable temperature for the bath is between 80–95° F. (27–35° C.).

The method of application is simply to dip the previously washed glass into the bath, allowing all parts to come in contact with the liquid, and sterilization is complete. The bath is harmless to the hands.

It must be understood that no disinfectant, no matter how efficient, can so readily disinfect a dirty glass. The particles of dirt (organic matter) envelop the

organisms and form a protective coating. To illustrate the truth of this statement, glasses infected by a broth culture of *streptococcus pyogenes*, were the organisms found to be alive. Therefore, after use at a fountain, glasses must not be permitted to become dry but should be, preferably, rinsed in tap water before going into the bath. This precaution would also help to maintain the efficiency for a longer period than otherwise would be possible. Care must be taken not to increase alkalinity by careless addition of wash water. Glasses are to be rinsed with clean water after the disinfecting bath.

TABULATION.

Disinfectant bath.	Organism.	Killed. Fresh bath.	Killed. Bath 24 hr. old.	Growth inhibited.
Exp. 1.—Boiling water	*Micrococcus aureus*	—	..	—
	Bacillus typhosus	—	..	+
	Streptococcus pyogenes	+	..	+
Exp. 2.—Calcium hypochlorite solution	*Micrococcus aureus*	+	—	+
0.04% available chlorine made alkaline	*Bacillus typhosus*	—	—	+
with sodium carbonate	*Streptococcus pyogenes*	—	—	—
Exp. 3.—Calcium hypochlorite solution	*Micrococcus aureus*	—	—	—
0.04% available chlorine made acid	*Bacillus typhosus*	—	—	—
with salicylic	*Streptococcus pyogenes*	—	—	—
Exp. 4.—Calcium hypochlorite solution	*Micrococcus aureus*	+	+	+
0.04% available chlorine	*Bacillus typhosus*	—	—	+
	Streptococcus pyogenes	—	—	—
Exp. 5.—Calcium hypochlorite solution	*Micrococcus aureus*	+	+	+
with 5 Gm. sodium carbonate per liter.	*Bacillus typhosus*	+	+	+
0.04% available chlorine	*Streptococcus pyogenes*	—	—	—
Exp. 6.—Calcium hypochlorite solution	*Micrococcus aureus*	+	—	+
0.06% available chlorine	*Bacillus typhosus*	+	—	+
	Streptococcus pyogenes	+	—	+
Exp. 7.—Calcium hypochlorite solution	*Micrococcus aureus*	+	+	+
0.06% available chlorine with 5 Gm.	*Bacillus typhosus*	+	+	+
sodium carbonate per liter	*Streptococcus pyogenes*	—	—	+
Exp. 8.—Experiment 7 repeated with same results				
Exp. 9.—Calcium hypochlorite solution	*Micrococcus aureus*	+	—	+
0.06% available chlorine made acid	*Bacillus typhosus*	+	—	+
with hydrochloric acid	*Streptococcus pyogenes*	+	—	+
Exp. 10.—Calcium hypochlorite solution	*Micrococcus aureus*	—	—	+
0.06% available chlorine with 2 Gm.	*Bacillus typhosus*	+	—	+
sodium salicylate per liter	*Streptococcus pyogenes*	—	—	—
Exp. 11.—Calcium hypochlorite solution	*Micrococcus aureus*	—	—	+
0.06% available chlorine with 10 Gm.	*Bacillus typhosus*	+	+	+
sodium carbonate and 2 Gm. sodium salicylate per liter	*Streptococcus pyogenes*	—	—	—
Exp. 12.—Calcium hypochlorite solution	*Micrococcus aureus*	+	+	+
0.06% available chlorine with 1 Gm.	*Bacillus typhosus*	+	+	+
mercuric chloride per liter	*Streptococcus pyogenes*	+	+	+
Exp. 13.—Sodium hypochlorite solution	*Micrococcus aureus*	—	—	+
0.04% available chlorine	*Bacillus typhosus*	—	—	+
	Streptococcus pyogenes	—	—	—
Exp. 14.—Sodium hypochlorite solution	*Micrococcus aureus*	—	—	+
0.4% available chlorine nearly neutral-	*Bacillus typhosus*	+	—	+
ized with hydrochloric acid	*Streptococcus pyogenes*	—	—	—

Disinfectant bath.	Organism.	Killed. Fresh bath.	Killed. Bath 24 hr. old.	Growth inhibited.
Exp. 15.—Sodium hypochlorite solution 0.05% available chlorine	*Micrococcus aureus*	—	—	—
	Bacillus typhosus	—	—	+
	Streptococcus pyogenes	—	—	—
Exp. 16.—Sodium hypochlorite solution 0.1% available chlorine	Results same as for Experiment 15			
Exp. 17.—Sodium hypochlorite solution 0.05% available chlorine + 50 Cc. $\frac{N}{10}$ HCl per liter	*Micrococcus aureus*	+	+	+
	Bacillus typhosus	+	+	+
	Streptococcus pyogenes	—	—	+
Exp. 18.—Sodium hypochlorite solution 0.05% available chlorine + 80 Cc. $\frac{N}{10}$ HCl per liter	*Micrococcus aureus*	+	+	+
	Bacillus typhosus	+	+	+
	Streptococcus pyogenes	+	+	+
Exp. 19.—Sodium hypochlorite solution 0.05% available chlorine + 120 Cc. $\frac{N}{10}$ HCl per liter	*Micrococcus aureus*	+	—	+
	Bacillus typhosus	+	+	+
	Streptococcus pyogenes	+	—	+

Solution No. 1 was made up by four different formulas using less sodium carbonate, and neutral baths of 0.05% available chlorine made from them, but all proved unsatisfactory.

Bath 18 was tried again with the same good results, and was found to be germicidal to *micrococcus aureus* and typhoid bacillus even after standing seven days. A liter was then tried on 150 glasses in a series and found to be efficient for that number. Although this bath under good conditions is germicidal more than 24 hours, it is strongly recommended that it be prepared fresh each day.

It may be noted in the experimental data that the hot water is not at all efficient in the time allowed. By comparing the results, it can be seen that a 0.06% available chlorine solution is of little more value than a 0.04% solution. A strong alkaline solution appears to be as good the second day as the first and to be as powerful as a neutral solution. The sodium carbonate tends to hold the chlorine in solution. A solution made acid with hydrochloric acid is strongly germicidal when freshly prepared, but of no value after standing 24 hours, because the chlorine is liberated and soon escapes from the solution. Sodium salicylate, germicidal in itself, appears to add no power to the hypochlorite solutions.

The sodium hypochlorite solution proved to be of no value even in a strong (0.1) available chlorine solution. This was a revelation very disappointing, to say the least. The idea of reducing the alkalinity suggested itself. Therefore, varying amounts of $\frac{N}{10}$ hydrochloric acid, sufficient to neutralize the solution, were added to Baths 17, 18 and 19. The results were somewhat striking in that it was found that the maximum results were obtained, as will be seen, in the mean between 17 and 19, namely, 18.

Baths 12 and 18 both proved highly satisfactory as far as germicidal power is concerned, but Bath 12 is undesirable and impracticable because of the highly poisonous character of mercuric chloride even in a 1: 1000 solution. Bath 18, on the other hand, is ideal in that it is non-poisonous, safe to handle, easily made, and inexpensive—one can of bleaching powder and one-half pound of sodium carbonate being sufficient for about 40 gallons of bath.

CONCLUSIONS.

1.—It will be seen that 19 different solutions of various compositions were experimented with. The solutions containing available chlorine were the only ones that were available for making a disinfectant bath. Of the various sodium hypochlorite baths tested, it was found that the amount of free chlorine was not the only factor that determined efficiency. For example, a bath containing 0.1% of available chlorine was no more efficient than one containing 0.04% or 0.05%.

2.—The efficiency of the hypochlorite bath seems to depend not only upon the available chlorine but also upon the degree of alkalinity of the solution. The most efficient solution seems to be that containing 0.05% of available chlorine and a degree of alkalinity represented by almost the neutral point. In order to determine the exact amount of alkalinity, an aliquot portion of the solution neutralized with its equivalent of HCl (the amount designated in Formula 18) was evaporated to dryness; the residue re-dissolved in distilled water and the resulting solution titrated. It was found that one Cc. of the original solution thus prepared corresponded to 5.0 Cc. of $\frac{N}{10}$ HCl. Since 10 Cc. are used in a liter of bath the alkalinity of this would make a liter of the bath correspond to 50 Cc. $\frac{N}{10}$ HCl.

3.—This solution of the above alkalinity can be arrived at by using the proportions indicated in Formula 18, using the solutions and mixing same as prescribed in said formula.

4.—Since one of the microörganisms resisted the boiling water bath and only two were inhibited in growth, therefore, it would seem that any treatment with boiling water, much less warm water, would be absolutely unreliable unless care was taken that the utensils were permitted to remain in such a bath for some minutes. It is also suggested that the wiping of the cleansed tumbler with a fabric would be objectionable for the reason that repeated use of same would tend toward a risk of contamination.

COMMERCIAL DISINFECTANT LIQUIDS.

Commercial proprietary disinfectants for the above purpose are on the market. We have examined two of these which have quite a wide distribution. These we will designate as A and B.

A, we found to be quite efficient and equal to our own solution.

B, although apparently surcharged with chlorine gas and claimed to be a bacillus destroyer, was wholly ineffective for making a disinfectant bath as above indicated.

Mention is made of these merely to show that laboratory tests should be made of such proprietary solutions and these preparations should be required to state on label the efficiency of the article in such terms as can be understood and the claimed efficiency tested by proper authorities.

"HONEST ADVERTISING WON'T SELL GOODS."*

BY LYMAN F. KEBLER, M.D.

As a sort of a hold-over of a once active Vigilance Committee[1] of the Retail Merchants' Association of Washington, D. C., and as an exponent of "Truth in Advertising," I have been assisting several of the local newspapers in keeping certain unfair advertising out of their columns. No definite plan of procedure was followed, excepting the general principle adopted by a medical sub-committee of the above Vigilance Committee, that no exceptions would be taken to a clean, honest advertisement of an honest product, provided the article was of such a character as not to bring injury to the public, either directly or indirectly. The reasons for this position are obvious. The sub-committee believed unfair methods were unnecessary to sell honest goods; that dishonest goods could not make their way by honest advertising, and that it was against public policy to aid in promoting an unclean or injurious article. In one case the management invited criticism of any unfair advertising, or the advertising of products that might bring injury to the public. In the second instance advance copies for insertion were submitted for review.

Fifteen years ago, with few exceptions, newspapers, magazines, periodicals and other media of publicity carried not only untruthful, but vile, salacious and even vicious advertisements. During recent years all of the high-grade periodicals, magazines and newspapers have eliminated most of the repugnant matter, but many still carry advertisements that the publishers know are unfair to the public or, by a little investigation, can easily ascertain their untruthfulness. The trend of business generally is toward fair dealing, but it must be admitted that much skepticism comes into one's mind when advised of the large sums of money accumulated by falsely advertising worthless products, or products that have a suggestion of value and thus give the promoter a talking point, or suggest some slight semblance of honesty.

As a pure fraud may be mentioned an alleged fat or weight producer, consisting of tablets containing small amounts of the several hypophosphites; a trace of lecithin, very much less than the amount contained in a single egg; a small dose of extract of nux vomica, and of sabal. This mixture was represented as a concentrated food, and the endorsement of reputable physicians and prominent food experts was claimed for it. As a matter of fact, the tablets did not possess either fat-producing or weight-making ingredients; neither were they endorsed by prominent food experts, nor reputable physicians. One of the widely advertised physicians who, it was claimed, had endorsed the product was a myth, pure and simple. The tablets were evolved by a druggist and an advertising promoter.

During the time the case was in Court, awaiting trial for about a year, the company extracted, through the use of the mails, from the unsuspecting public, approximately $500,000. The tablets contained in the $1.00 treatment cost less than $2\frac{1}{2}$ cents. The scheme was found by jury trial to be executed in violation of the Federal Criminal Statutes and the Court fined the promoters $30,000.

* Read before the Section on Commercial Interests, A. Ph. A., City of Washington meeting, 1920.

[1] JOUR. A. PH. A., 8, 201 (1919).

Another is an Eye Water Scheme consisting of a watery solution of 2.5 per-cent each of salt and sugar. By the dropping of this mixture into the eyes of the afflicted, it was claimed that remarkable cures of divers and serious diseases were effected. Among the ailments advertised as being cured by this means were asthma, bladder troubles, blindness, catarrh, cataract, deafness, dropsy, eczema, a bullet wound in the thigh, epilepsy, fits, goiter, hay fever, heart trouble, kidney trouble, neuralgia, nervous prostration, sore eyes, syphilis, rupture, tumors, etc. It was established in Court that one advertising firm was paid $175,000 in a single year for the advertising of this alleged marvelous cure.

An attractive income, until very recently, was also secured by falsely and fraudulently representing to cure cancer, Bright's disease, consumption, diphtheria, and a host of other ailments, by means of a 0.2 percent watery solution of sulphur dioxide.

These are only a few of the hundreds that have received consideration and there are still scores of alleged cures for tuberculosis, cancer, venereal diseases, Bright's disease, etc., advertised through the press.

It might be interesting to relate the events that led to the statement "Honest Advertising Won't Sell Goods." One of the papers mentioned above referred some of the advance copies of advertising for criticism. Attention was called to some of the unfair features. The agency endeavoring to place the advertisements was very much incensed, and took the critic rather severely to task, bolstering up his case by substituting copies of correspondence used to successfully cow a prominent New York paper. A reply was made to this attack, calling attention to the fallacies of certain arguments presented. One contention was that medical men were prejudiced and not qualified to review medical advertisements, because they do not properly comprehend the advertising side of the business. In due time a representative of the firm made a visit to Washington to see the critic. The agent admitted at the outset that the criticism made in conjunction with the advertising matter submitted formerly was justified, but that he desired to submit another series of advertisements which were above reproach. A brief review of the revised matter showed that it contained similar misrepresentations, a little more cunningly adjusted. After reviewing most of the advertisements, attention was called to certain unfair features and at this juncture the advertising agent responded, "Doctor, Honest Advertising Won't Sell Goods." He was immediately informed that if he came with any such preconceived notions, we had nothing in common, because I was convinced that it did not require untruthful advertising to sell honest merchandise, and, furthermore, it was a tacit admission that the article he was attempting to advertise had little merit.

My position brings me in contact with so much untruthful advertising that separates the public from its money, that I sometimes wonder whether the statement, "Honest Advertising Won't Sell Goods," is simply a blunt form of the old slogan "Business is Business." In order to secure the ideas of others a letter was addressed to the Secretary of the Associated Advertising Clubs of the World, with the request that the views of those qualified to speak on this subject be obtained. A goodly number of responses was received. Space forbids giving the replies in full, but the following extracts do not leave any doubt in the matter.

"Argument that 'HONEST ADVERTISING WON'T SELL GOODS' is simply the argument of a charlatan and one who is trying to put over a product that is as false as his advertisement.

"It may be true that dishonest advertising will create a demand for a product temporarily, the same as you can sell a beautiful package of sawdust marked 'breakfast food' once; the repeat business, however, will not amount to anything."

COLUMBIA GRAPHOPHONE COMPANY,
G. W. HOPKINS, *General Sales Manager.*

"The advertising agency man who said 'Honest Advertising Won't Sell Goods' is sadly in error."

H. J. KENNER, *Secretary,*
National Vigilance Committee, Associated Advertising Clubs.

"I have been requested to express an opinion to you on the subject, 'Honest Advertising Won't Sell Goods.'

"I would like to get a good look at the advertising man who made such a statement as that, and I would like to know something about his past history. I would then like to put him out of his misery and have him mounted for exhibition purposes in the Smithsonian Institution.

"I would like to have him discuss with the newspapers of this city, who have given considerable attention to the matter of honesty in advertising, and ask them to show him the list of notoriously dishonest advertisers who have gone out of business in Detroit in the past ten years simply because the public refused to believe anything they said in the paper.

"As a matter of fact, such a statement as that, 'Honest Advertising Won't Sell Goods,' is so utterly asinine that it should not be given serious consideration."

H. C. DART, *Advertising Manager,*
Paige Detroit Motor Car Company.

"It is most surprising that a man in the advertising business, particularly if he be in any way conscientious, should be guilty of making the statement, 'Honest Advertising Won't Sell Goods.' If this is his honest judgment, however, certainly it should be corrected.

"When we wish to symbolize all hazard in trade, we refer to horse trading, an exchange honeycombed with suspicion and duplicity. And to-day practically all states have specific laws giving relief to the victimized purchaser of a horse. Many people speak disparagingly of Patent medicines, and public sentiment, long credulous to the dishonest advertising of *some* proprietaries, largely condemns all such remedies as a class. If evidence were wanted as to the moral danger of dishonest advertising, the history of proprietaries advertised to the public would provide striking facts."

NOBLE T. PRAIGG, *Advisory Counsel,*
United Typothetae of America.

"Mr. H. J. Kenner tells me that some alleged advertising man has made the statement to you that 'Honest Advertising Won't Sell Goods.' Of course you cannot take a crooked plan or a near-great product and put it over in truth, but certainly the service or merchandise that confesses that it must go into partnership with falsehood in order to succeed is better deposited among the failures from everybody's viewpoint.

"The man who made the statement to you is not entitled to serious consideration."

THE NEW ORLEANS ITEM,
A. G. NEWMEYER.

"'Honest Advertising Won't Sell Goods.' It is incredible to me that in this day and age any competent advertising man could make such a remark.

"If it were true that honest advertising would not sell goods, I think I know myself well enough to say that I should not be in the business, nor would most of the advertising men whom I know."

GRAFTON H. PERKINS, *Advertising Director,*
William R. Warner & Company, Manufacturing Pharmaceutists.

"If you are referring to the building up of a permanent business whose foundation rests upon the good will of the public, then there can be but one answer to this question—honesty.

"If our leaders of business and industry are to continue to put vast sums of money each year into advertising, then they have the right to demand from newspaper and magazine publishers that the confidence of the public in advertising be conserved. Unless that is done, neither honest nor dishonest advertising will pay."

A. B. KIRSCHBAUM CO.,
DAVID KIRSCHBAUM, Philadelphia.

"With me it's a conviction that honest advertising is the only kind of advertising that will continuously and successfully sell goods. It is possible that the 'quack medicine' field is an exception to this, as dishonest advertising would probably best fit it with dishonest goods. And personally,—and I know of very many advertising men that will agree with me,—it is my belief that under-statement rather than over-statement is most effective in advertising."

L. B. JONES, *Advertising Manager,*
Eastman Kodak Company.

"Honest advertising is the only kind that will sell goods more than once. It is perfectly true and probably he has experienced the result of selling goods by misleading advertising, but once a customer is misled, he not only is disappointed, but distrusts all advertising.

"The boy who cried 'Wolf' was able at first to get assistance, but after he had deceived his protector several times, the third time he was destroyed by the wolf, and that is true of misleading advertising—it will eventually destroy the advertiser."

ROWE STEWART, *Vice-President,*
Associated Advertising Clubs, *Philadelphia Record.*

"The advertising columns of *The New York Times* demonstrate that 'honesty is the best policy' in advertising as well as in everything else.

"Despite the complaints of advertisers that their copy is weakened by the elimination of unwarranted, sometimes misleading and often exaggerated statements, the results from the publication of the revised advertisements in the *Times* are very profitable and the advertising space is in great demand." T. WILEY, *Business Manager, New York Times.*

"In every business there are some men who make statements which are radical and who, because of their prominence in the business, do irreparable harm to the industry with which they are connected.

"The advertising agency that told you that 'Honest Advertising Won't Sell Goods' is in the class with the man who says that all religion is wrong because some minister has committed a crime or gotten into trouble.

"The truth in advertising movement has been one of the greatest forces in business and every legitimate business man who uses advertising realizes this fact.

"The day will come when all business will use advertising and this great tendency is not promised on a dishonest basis in the advertising of to-day. The man who says it is, is merely trying to ease his conscience in a way that is nothing short of a perversion of facts."

JOHN RING, *President,*
John Ring Advertising Company, St. Louis.

"The man who contends that 'Honest Advertising Won't Sell Goods' is either a knave or a fool. This is a strong indictment, but for the life of me I cannot see how anybody engaged in business would have the nerve to make such a statement. I stand squarely on the statement that he is clean out of harmony with the trend of the times and he had better go hammering horseshoes than try his hand at the manufacturing business, with the aid of dishonest advertising."

W. C. D'ARCY,
D'Arcy Advertising Company, St. Louis.

The above quotations contain some severe indictments. The representative of a well-known advertising agency is characterized as a charlatan, a knave and a fool. Let it be said, however, that he may be all these and more, but the facts are that the same untruthful advertisements that provoked the title of this article are being carried in some of our apparently high-class newspapers. "Horsetrading" and "quack medicines" are stigmatized as representing the lowest strata of unfair dealing with the public. With the great changes that have been brought about during the past decade in advertising, we feel, with the poet, confident that "Truth crushed to earth shall rise again."

DEPARTMENT OF COMMERCIAL INTERESTS

CONDUCTED BY DR. ROBERT P. FISCHELIS.

In the last article of this series we mentioned that a discussion of drug store advertising and selling narrowed itself down to a consideration of the seller or storekeeper, the goods to be sold, and the buyer. Then we discussed the seller, pointing out that it was necessary for him to make a study of the buyer, classifying him as to type of mind and appealing to him accordingly.

Let us now discuss the goods to be sold. We have pointed out a number of times that the underlying reason why people prefer to buy non-pharmaceutical merchandise at the drug store is because of a belief that the druggist handles a better class of merchandise and buys more discriminately. The druggist should at all times bear this fact in mind and take particular pride in purchasing goods of the right quality.

If you were to go to an advertising agency to-day with a product to be given national publicity, the first investigation the expert advertising man would make would be of the product itself. The day is past when a poor product can stand national advertising. Hence the first requirement of any product to be offered for sale is that it shall be able to withstand the most elaborate investigation—to prove its worth in a competitive field. How many pharmacists subject the articles they buy to any definite series of tests in order to prove their sales possibilities?

What are the questions one should ask about a product before deciding to stand sponsor for it as a merchant of the first class? The following seem to be of greatest importance:

1. Is the product really worth while?
2. Does it fill a real need, or is it to be classified as a luxury?
3. Will my class of trade be interested in it sufficiently to buy?
4. Can it be classed as a repeater, or is it in the class of one-time sellers?
5. Does it yield a sufficiently large profit?
6. How much competition is there on the product?
7. What is its past sales record and what are the sales records of similar products?
8. What are the producers doing to push the sales of the article through advertising, etc.?
9. Is it the type of product which will fit in with the usually accepted drug store side-lines?

Other questions might be asked, but if the answers to all of the foregoing are satisfactory, one is certainly justified in stocking the article and backing it.

John Lee Mahin, a well-known authority on advertising, in one of his books points out that a certain portion of every man's income is necessarily devoted to providing the necessities of life—food, shelter, and clothing. Business in these necessities is more or less stable and cannot be influenced greatly by advertising excepting in the matter of switching customers from one brand to another. The dollars which are devoted to the purchase of these necessities Mr. Mahin terms "mortgaged dollars;" in other words, they constitute that portion of the weekly pay or monthly income which must be spent along definite lines. Out of every week's pay or monthly income there is a group of dollars—large or small—which he terms "free dollars." They constitute a surplus which some people save but

most people spend. Every article of merchandise that is salable is sold either to supply an absolute need or a desire for greater comfort. "Mortgaged dollars" buy necessities; "free dollars" buy comforts or luxuries. The sales appeal is different in each case. The seller must decide under which heading each article belongs, and treat it accordingly, from both buying and selling viewpoints. For example, epsom salt used as a drug comes under the heading of necessities—all drugs of proven value purchased as household remedies can be thus classified. There can be no question as to what kind of epsom salt to buy. Only U. S. P. quality will be satisfactory, no matter whether the trade is rich or poor. On the other hand, face powder would be classed as a luxury, and the kind or quality of face powder to be purchased for sale in any given locality is determined by the class of trade or, in other words, the supply of "free dollars."

Experience is the greatest factor entering into a consideration of the goods to be handled in any establishment. To gain this experience, constant study of the quality of goods must be coupled with constant study of the people who trade at the store. Trade journals, as well as popular magazines and newspapers, make it possible to add the experience of others to your own.

DENTIFRICE FORMULAS FOR THE NATIONAL FORMULARY.

BY BERNARD FANTUS AND CLYDE M. SNOW.

In view of the enormous demand for dentifrice preparations and of the fact that nearly all manufacturers of pharmaceuticals and many retail pharmacists have their "own" formulas for such products, it seems remarkable that there are no official dentifrice formulas. Physicians and dentists, who might desire to prescribe a non-proprietary non-secret mouth wash, tooth powder or tooth paste, and pharmacists, who wish to put up such preparations, ought to be accommodated by a formula, if not in the Pharmacopoeia, at least in the National Formulary. Such formulas ought not only to be as good as, but better than the various proprietary preparations on the market, because they should have behind them the combined wisdom of the medical and pharmaceutical professions. The subjoined study of the subject is offered—not, of course, with any pretense at possession of such knowledge—but to serve as a basis for discussion, criticism, and possibly final elaboration of suitable formulas.

The multiplicity of recipes available in literature makes necessary the development of fundamental principles for guidance in the construction of the formulas.

1. It is an established fact that the mouth cannot possibly be disinfected: for bacteria have a greater resistance against chemicals than the cells of the body. Killing the bacteria would mean killing the cells with which they are in intimate contact, and destroying the lining membrane of the mouth. This is, of course, out of the question. Although it is possible to tolerate in the mouth antiseptic solutions in such concentration as to inhibit the growth of bacteria, such bacteriostatic (germ growth inhibitive) solutions are of value only as long as they are present in sufficient concentration, which, in case of the mouth, is possible for a negligibly short period only, as nobody would care to keep his mouth filled with fluid for any considerable time. *Attempts at imparting antiseptic properties to dentifrices are therefore unscientific.* They are also inexpedient, owing to the bad taste, offensive odor or toxic properties possessed by most of the active agents of this class.

2. To inhibit the growth of bacteria in the mouth and thus prevent dental decay, the presence of culture medium should be minimized by cleanliness. Hence, the efficiency of a

dentifrice depends upon its detergent qualities, and soap is a universally desirable ingredient. In tooth powders and pastes, a powder free from grittiness, such as prepared chalk, is the second chief constituent.

3. Alkali is of no advantage, as—though granting dental decay to be due to acid—the alkali cannot possibly be made to stay in the mouth long enough to do any appreciable good.

4. Pleasant odor, taste and appearance are the chief desiderata for these preparations. The more pleasant they are, the more faithfully will they be employed. Peppermint, by reason of the refreshing coolness it leaves in the mouth, is perhaps the single most desirable flavor for mouth preparations. As there are persons who dislike this flavor, it is good policy to disguise it by means of other essential oils such as those of cassia and of cloves, thus producing a "bouquet" which not only is more generally liked, but also palls less readily upon the palate than a single decided flavor. A mild degree of sweetness is generally enjoyed. This should be imparted to a mouth preparation by benzosulphinide rather than sugar, as the latter might furnish pabulum for the growth of bacteria. A pretty pink or red color adds to the attractiveness of the preparation.

We, therefore, propose the following formula for consideration:

TINCTURA DENTIFRICIA.

LIQUID DENTIFRICE.

Soap, dried and granulated	60.0 Gm.
Benzosulphinide	2.0 Gm.
Basic fuchsin	0.02 Gm.
Oil of cassia	5.0 Cc.
Oil of peppermint	5.0 Cc.
Oil of cloves	10.0 Cc.
Alcohol	750.0 Cc.
Water, to make	1000.0 Cc.

Dissolve the soap in the alcohol with the aid of gentle heat on a water-bath, add the benzosulphinide, basic fuchsin, and the volatile oils, and finally enough water to make the product measure 1000 Cc. Agitate the mixture, set it aside in a cool place for twenty-four hours, and then filter.

A few drops of this tincture added to a little water to be used as a mouth-wash.

PULVIS DENTIFRICIUS.

DENTIFRICE POWDER.

Benzosulphinide	0.25 Gm.
Solution of carmine	2.00 Cc.
Oil of cassia	0.50 Cc.
Oil of peppermint	0.50 Cc.
Oil of cloves	1.00 Cc.
Soap, dried and granulated	10.00 Gm.
Prepared chalk	90.00 Gm.

Reduce the soap and the chalk to a fine powder, mix them thoroughly with each other and with the other ingredients, and finally pass the powder through a No. 60 sieve.

Tooth-pastes are perhaps more generally employed than all other dentifrice preparations combined. However, at the present moment, we hesitate advocating the inclusion in the National Formulary of a formula for such paste, as it is more troublesome to prepare on a small scale than are the other forms, and it requires being dispensed in collapsible tubes. It might be well just now to postpone the addition of a dentifrice paste to the National Formulary, until a trial of the simpler preparations has shown the justification of their introduction into the Formulary, and a demand for the tooth-paste formula arises.

PHARMACY LABORATORY,
UNIVERSITY OF ILLINOIS.

BIBLIOGRAPHY OF PHARMACEUTICAL RESEARCH

Conducted by H. V. Arny, Reporter on the Progress of Pharmacy, Chairman of the Committee on Research.

On these pages, each month, will be found a list of articles on pharmaceutical research that appear in the pharmaceutical and other scientific journals of the world. Whenever possible, the list appearing a certain month will record articles appearing in American journals of the preceding month and articles appearing in foreign journals will be recorded as quickly as possible after the journals reach the Reporter.

All articles appearing in these lists will be presented in abstract form in the bound volumes of the YEAR BOOK, which will be issued as soon after the end of the year represented as editing and printing conditions permit. Those desiring abstracts immediately can obtain same for a fee of one dollar each by communicating with H. V. Arny, 115 West 68th St., New York, and arrangements can also be made for securing photographic reproduction of entire articles at moderate prices when such are desired.

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Schweiz. Apoth. Ztg., 58 (Sept. 30, 1920), 497

Clark, A. W., Smith, R. O., and Forman, L.
Purity standards for absorbent cotton
J. Am. Pharm. Assoc., 9 (Oct. 1920), 958

DeWaal, M.
Insecticidal power of Helenium autumnale
Pharm. Weekbl., 57 (Sept. 11, 1920), 1100

Doyon, M.
Factors influencing coagulation of milk
J. pharm. chim., 22 (Sept. 1, 1920), 200

Farcy, L.
Candelilla wax
Ann. falsif., through *J. pharm. chim.*, 22 (Sept. 1, 1920), 174

Gerstenberger, H. J., and Champion, W. M.
Constipating action of orange juice
Am. J. Diseases Children, through *Pharm. Weekbl.*, 57 (Sept. 25, 1920), 1178

Greenish, H. G.
Collection of squill
Pharm. J., 105 (Sept. 18, 1920), 284

Greenish, H. G.
Production of acacia
Pharm. J., 105 (Sept. 11, 1920), 265

Grimme
Mulatinhos, a Brazilian bean
Pharm. Zent., 61 (July 29, 1920), 421

Gunsaulis, E. N.
Sugar from the nipa palm
Comm. Repts., through *Drug. Circ.*, 64 (Oct. 1920), 381

Hess
Tomato as anti-scorbutic
N. Y. J. Med., through *Chem. & Drug.*, 93 (Sept. 11, 1920), 1269

Kilmer, F. B., and Smith, R. O.
Practical belladonna culture
Am. J. Pharm., 92 (Sept. 1920), 620

Krueche, A.
Hop branches as surgical dressings
Pharm. Ztg., through *Pharm. Zent.*, 61 (July 22, 1920), 409

Leake, H. M., and Pershad, B. R.
Empire opium
J. Genetics, through *Pharm. J.*, 105 (Sept. 18, 1920), 292

Leclerc
Passiflora in influenza
J. pharm. chim., 22 (Aug. 16, 1920), 158
Sabalitschke, T.
Collection of chamomile
Filz. Kräuterfreund, through *Pharm. Weekbl.*, 57 (Sept. 4, 1920), 1080
Trabut
Eucalyptus in diabetes
Bull. Gen. Therap., through *Pharm. J.*, 105 (Sept. 18, 1920), 287
Tschirch, A.
Natural and artificial resins
Schweiz. Apoth. Ztg., 58 (Sept. 23, 1920), 485 and (Sept. 30, 1920), 503
Vamossy
Identification of palthe senna
Pharm. Monatsh., through *Drug. Circ.*, 64 (Oct. 1920) 382
Van der Wielen, P.
Uses of chenopodium
Onze Juinen, through *Chem. & Drug.*, 93 (Sept. 25, 1920), 1334

GENERAL AND PHYSICAL CHEMISTRY.

Collins, H.
Constitution and structure of the elements
Chem. News, 121 (Oct. 1, 1920), 157
Escaich, A.
Some chemical tests
J. pharm. chim., 22 (Aug. 16, 1920), 138
Sasse, O.
Some volumetric assays
Pharm. Zent., 65 (July 28, 1920), 559

INORGANIC CHEMICALS.

Anon
Zirconium oxide in radiography
Chem. & Drug., 93 (Sept. 11, 1920), 1270
Barry, P.
Colloidal sulphur
Compt. rend., through *Chem. News*, 121 (Sept. 21, 1920), 142
Coupin
Detection of cobalt in nickel
Bull. Sci. Pharmacol., through *Drug. Circ.*, 64 (Oct. 1920), 382
Denigès, G.
Iodic acid as micro-reagent for calcium, strontium and barium
Compt. rend., through *J. pharm. chim.*, 22 (Sept. 1, 1920), 197
Druce, J. G. F.
Volumetric assay of tin
Chem. News, 121 (Oct. 8, 1920), 173
Giaya, S.
Zinc in the human organism
Compt. rend., through *J. pharm. chim.*, 22 (Sept. 1, 1920), 195
Gutbier, A., and Weise, G. L.
Assay of tungstic acid
Z. anal. Chem., through *Pharm. Zent.*, 61 (Aug. 12, 1920), 456
Kolthoff, I. M.
Separation of barium, strontium and calcium by the chromate method
Pharm. Weekbl., 57 (Sept. 4, 1920), 1080
Loeffl, K.
Calcium biphosphate
Pharm. Ztg., 65 (Aug. 14, 1920), 607
Michaelis, L. and Rona, P.
Adsorptive power of animal charcoal
Biochem. Z., through *Pharm. Zent.*, 61 (Aug. 12, 1920), 456
Moore, H.
Nitrogen peroxide in the atmosphere
Southern Pharm. J., 13 (Oct. 1920), 74
Petersen
Separation of antimony, arsenic and tin
Z. anorg. Chem., through *Drug. Circ.*, 64 (Oct. 1920), 381
Prescher, J.
Calcium carbonate assay
Pharm. Zent., 61 (Aug. 12, 1920), 453
Thiel, A.
Allotropism of lead
Ber., through *Pharm. Zent.*, 61 (July 29, 1920), 425

ORGANIC CHEMICALS.

Anon
Poisoning by aspirin
Brit. Med. J., through *Pharm. J.*, 105 (Sept. 4, 1920), 256
Anon
Tea seed oil
Chem. Umschau, through *Pharm. Zent.*, 61 (July 22, 1920), 412
Anon
Toxic effect of arsphenamine
Can. Med. Assoc. J., through *Am. J. Pharm.*, 92 (Sept. 1920), 680
Anon
Trichlorethylene as fat solvent
Chem. Umschau, through *Pharm. Zent.*, 61 (July 29, 1920), 424
Arnoldi, W.
Therapeutics of atropine
Berl. klin. Wschr., through *Pharm. Zent.*, 61 (July 29, 1920), 429

Audrain
Ether injections in whooping-cough
Med. Press, through *Pharm. J.*, 105 (Sept. 4, 1920), 250

Borisch
Therapeutics of synthetic camphor
Pharm. Zent., 61 (July 22, 1920), 404

Bougault, J., and Perrier, J.
Action of hydrocyanic acid on glucose
J. pharm. chim., 22 (Aug. 16, 1920), 129

Busquet, H., and Vischniac, C.
Fate of olive oil injected into blood stream
J. pharm. chim., 22 (Sept. 1, 1920), 201

Capelli, G.
Physical properties of acetylsalicylic acid
Chem. & Drug., 93 (Sept. 11, 1920), 1274

Carlinfanti and Scelba
Assay of small amounts of alkaloids
Chem. Zent., through *Pharm. Zent.*, 61 (July 29, 1920), 423

Chenisse, L.
External use of pepsin
Presse. Med., through *Chem. & Drug.*, 93 (Sept. 11, 1920), 1283

Clapp, C. A., and Martin, M. G.
Mercurochrome in opthalmia neonatorum
J. Am. Med. Assoc., through *Am. J. Pharm.*, 92 (Sept. 1920), 682

Dimroth, O., and Kaemmerer, H.
Structure of carminic acid
Ber., through *Pharm. Zent.*, 61 (Aug. 5, 1920), 439

Dunstan
Vanillin from oil of pimento leaves
Chem. & Drug., 93 (Sept. 4, 1920), 1253

Fleury, P.
Iodometric assay of aromatic arsenous compounds
Bull. Soc. Chim., through *J. Soc. Chem. Ind.*, 39 (Sept. 30, 192c), 638A

Fleury, E.
Morocco argan oil
J. pharm. chim., 22 (Sept. 1920), 165

Fuchs, W., and Elsner, B.
Tautomery of resorcin
Ber., through *Pharm. Zent.*, 61 (Aug. 5, 1920), 439

Gascard, A.
Brodie's myricyl alcohol
Compt. rend., through *J. pharm. chim.*, 22 (Sept. 1, 1920), 194

Gettler, A. O.
Methyl alcohol tests
J. Biol. Chem., through *J. Soc. Chem. Ind.*, 39 (Sept. 30, 1920), 613A

Giribaldi
Sodium chloride as antidote for strychnine
Gas. Ospedalie Clin., through *Am. J. Pharm.*, 92 (Sept. 1920), 680

Gomberg, M., and Buchler, C. C.
Preparation of benzyl esters from benzyl chloride
J. Am. Chem. Soc., 42 (Oct. 1920), 2059

Graham
Sodium chloride as antidote for chloroform
Arch. Int. Med., through *Pharm. Era*, 53 (Oct. 1920), 305

Greger, J.
Refractive index of rosin
Chem. Umschau, through *Pharm. Zent.*, 61 (Aug. 5, 1920), 439

Hackh, I. W. D.
Structural relations of volatile oils
J. Am. Pharm. Assoc., 9 (Oct. 1920), 948

Hanzlik, P. J.
Degree of alkalinity in the formaldehyde-phloroglucin test
J. Biol. Chem., through *J. Soc. Chem. Ind.*, 39 (Sept. 15, 1920), 610A

Hjort, A. N., and Kaufman, C. E.
Phenylmethyl carbinol as local anesthetic
J. Pharmacol. Exp. Therap., through *Am. J. Pharm.*, 92 (Sept. 1920), 683

Holde, D.
Separation of fixed oils from mineral oils
Chem. Umschau, through *Pharm. Zent.*, 61 (July 29, 1920), 425

Langworthy, C. F., and Deuel, H. J.
Digestibility of raw starches
J. Biol. Chem., through *Pharm. J.*, 105 (Sept. 11, 1920), 271

Leslie, E. H., and Carpenter, C. D.
Conversion of sodium formate into the oxalate
Chem. Met. Eng., through *J. Soc. Chem. Ind.*, 39 (Sept. 30, 1920), 639A

Loeffe, K.
Synthesis of fatty acids from paraffin
Chem. Ztg., through *J. Soc. Chem. Ind.*, 39 (Sept. 15, 1920), 604A

Luce, E.
Composition of fusel oil
J. pharm. chim., 22 (Aug. 16, 1920), 136

Macht, D. I.
Benzyl benzoate in hiccough
Med. Rec., through *Pharm. J.*, 105 (Sept. 11, 1920), 271

MacLean, J. S., and Thomas, E. M.
Nature of yeast fat
Biochem. J., through *J. Soc. Chem. Ind.*, 39 (Sept. 15, 1920), 604A

Marie, Crouzon and Bouttier
Boro-potassic tartrate in epilepsy
Bull. Acad. Med., through *J. pharm. chim.*, 22 (Sept. 1, 1920), 188
Martin, F.
Dichlorethyl sulphide
J. pharm. chim., 22 (Sept. 1, 1920), 161
Masfarand, S.
Practical distillation of alcohol, acetone and ether
J. Soc. Chem. Ind., 39 (Sept. 15, 1920), 299T
Matthes, H., and Rossie, W.
Walnut oil
Arch. Pharm., through *Pharm. Zent.*, 61 (July 22, 1920), 412
Messner, J.
Hydroquinone
Pharm. Zent., 61 (Aug. 12, 1920), 454
Murayama, Y.
Oil of *Mossla grosseserrata*
J. Pharm. Soc. Japan, through *J. Soc. Chem. Ind.*, 39 (Sept. 30, 1920), 640A
Nassauer, M.
Aniline poisoning
Z. angew. Chem., through *Am. J. Pharm.*, 92 (Sept. 1920), 679
Neumann, B., and Schneider, A.
Conversion of acetylene into acetaldehyde and acetic acid
Z. angew. chem., through *J. Soc. Chem. Ind.*, 39 (Sept. 30, 1920), 639A
Nooyan, A. M.
Urson and its distribution in plants
Pharm. Weekbl., 57 (Sept. 18, 1920), 1128
Osborne, T. B., Mendel, L. B., and Wakeman, A. J.
Water-soluble vitamines in common fruits
J. Biol. Chem., through *J. Soc. Chem. Ind.*, 39 (Sept. 15, 1920), 609A
Patein, G.
Poisoning with hexamethylenamine
Bull. Acad. Med., through *J. pharm. chim.*, 22 (Sept. 1, 1920), 190
Raiziss, G. W., Kolmer, J. A., and Gavron, J. L.
Chemotherapy of organic arsenic and mercury compounds
J. Biol. Chem., through *J. pharm. chim.*, 22 (Sept. 1, 1920), 184
Richards, P. A. E.
Detection and assay of cocaine, heroine and veronal in the cadaver
Analyst, through *Pharm. Zent.*, 61 (July 22, 1920), 406
Richmond, H. D.
Nitroglycerin assay
Analyst, through *J. Soc. Chem. Ind.*, 39 (Sept. 30, 1920), 640A
Roth, G. B.
Alkalinized arsphenamine solution toxic when exposed to air
U. S. Pub. Health Bull., through J. Am. Pharm. Assoc., 9 (Oct. 1920), 1023
Sandquist and Mohlin
Decomposition of amyl nitrite
Svensk Farm. Tid., through *Pharm. Zent.*, 61 (Aug. 12, 1920), 455
Sloboziano
Betanaphthol in itch
Gaz. Hopit., through *Pharm. J.*, 105 (Sept. 4, 1920), 250
Strathy
Toxic effect of arsphenamine
Lancet, through *Am. J. Pharm.*, 92 (Sept. 1920), 681
Tanret, G.
Pelletierine and methyl pelletierine
Bull. Soc. Chim., through *J. Soc. Chem. Ind.*, 39 (Sept. 30, 1920), 638A
Tschirch, A.
What are vitamines?
Schweiz. Med. Wschr., through *Pharm. Zent.*, 61 (July 29, 1920), 416
Von Euler, H., and Svanberg, O.
Preparation of active invertase
Z. physiol. Chem., through *J. Soc. Chem. Ind.*, 39 (Sept. 30, 1920), 636A
Williams, R. J.
Vitamine assay
J. Biol. Chem., through *J. Soc. Chem. Ind.*, 39 (Sept. 15, 1920), 608A

CLINIC DIAGNOSTIC METHODS.

Anon
Clinical sugar assays
Schweiz. Apoth. Ztg., 58 (Sept. 23, 1920), 490
Authenrieth, W., and Montigny, W.
Assay of mercury in urine
Münch. Med. Wschr., through *Pharm. Weekbl.*, 57 (Sept. 11, 1920), 1113
Frankel, M.
Urea assay
Ann. chim. anal., through *Pharm. J.*, 105 (Sept. 4, 1920), 250
Gerhardt, O.
Diagnostic significance of sarcina in stomach contents
Münch. Med. Wsch., through *Pharm. Zent.*, 61 (Aug. 12, 1920), 456
Jolles, A.
Detection of indican in urine, etc.
Med. Klin., through *Pharm. Zent.*, 61 (July 22, 1920), 408

Pégurier, G.
Assay of albumin in urine
Rep. Pharm., through *Pharm. J.*, 105 (Sept. 4, 1920), 250

MISCELLANEOUS.

Anon
Hand cleaner
Cal. Ret. Drug. J., through *Pharm. Era*, 53 (Oct. 1920), 306

Anon
Lavatory deodorant
Nat. Drug., through *Pharm. Era*, 53 (Oct. 1920), 306

Anon
Luminous paints
Drogenhandler, through *Pharm. Zent.*, 5 (Aug. 5, 1920), 445

Jones. H. I., and DuBois, R.
Coating to preserve eggs
Drug. Circ., 64 (Oct. 1920), 384

Marchadier and Goujon
Compressed, granulated and powdered eggs
Ann. falsif., through *J. pharm. chim.*, 22 (Sept. 1, 1920), 192

Tinkler, C. R., and Soar, M. C.
Cause of darkening of hard-boiled egg yolk
Biochem. J., through *Pharm. J.*, 105 (Sept. 4, 1920), 250

PROCEEDINGS OF THE LOCAL BRANCHES

"All papers presented to the Association and its branches shall become the property of the Association, with the understanding that they are not to be published in any other publication than those of the Association, except by consent of the Committee on Publication."—By-Laws Chapter X, Art. III.

Reports of the meetings of the Local Branches should be mailed to the Editor on the day following the meeting, if possible. Minutes should be typewritten, with wide spaces between the lines. Care should be taken to give proper names correctly, and manuscript should be signed by the reporter. To maintain its activity and representation each Branch should see that at least three of its meetings during the year are reported in the Journal.

CHICAGO.

The 112th monthly meeting of the Chicago Branch, A. Ph. A., was held Friday evening, October 29, at the College of Pharmacy building with a lecture by Dr. Edward Kremers, entitled "The Evolution of the Apothecary and His Shop."

He was warmly welcomed by an audience filling the large lecture room. After the meeting was opened, Dr. Kremers was given the platform and presented his subject as only such an authority on pharmaceutical history could do. The many lantern illustrations from the "apothecia" of Egypt and Greece, 1500 B.C., to the most modern drug stores, added greatly to the appreciation of the lecture.

Preceding the lecture, the officers of the Branch gave a dinner to Dr. and Mrs. Kremers at the Hotel LaSalle.

A synopsis of the lecture follows:

THE EVOLUTION OF THE APOTHECARY AND HIS SHOP.

(Synopsis and Illustrations.)

Derivation of the word "apotheke," *i. e.*, a place for storage. Thus the modern German word for library, *viz.*, "bibliothek" is a storage place for books. One of the art galleries in Munich, the "Pinkothek," is a storage place for paintings.

The word pharmacist is derived from another Greek word meaning a medicament.

The precursors of the modern apothecary and his shop:

1. In Egypt (priests and later charlatans).
2. In Greece (root cutters, ointment makers, ointment sellers, etc.).
3. In Rome (medicine peddlers, herbalists, the street of the ointment makers).
4. Among the Arabians (hospital pharmacies. First public pharmacy in Bagdad in 8th century).
5. Among Christians (Monastic dispensaries).

The modern apothecary or pharmacist.

The first public apothecary shop in Naples in the 11th century.

Separation of pharmacy from medicine.

Establishment of apothecary shops in Germany since the 12th century.

1. Hospital dispensaries.
2. Court apothecaries.

3. Municipal apothecaries.
   a. Real concessions.
   b. Personal concessions.

The evolution of the "chemist and druggist" in England.

The physician and his assistant, the apothecary.

The apothecary a medico-pharmaceutical practitioner.

The grocers, or sellers "engros," and the "chemist and druggist."

The modern "pharmaceutical chemist."

The druggist and pharmacist in the United States.

Early development along English lines.

The advent of the German "apotheker."

Legislative restrictions and control.

The groping of the modern drug store to meet the demands of the people.

DETROIT.

The Detroit Branch of the American Pharmaceutical Association held the first meeting of the 1920–21 season on the evening of October 15 at the Wayne County Medical Society.

A luncheon was served preceding the meeting.

At 8.15 the meeting was called to order by President Chase, who outlined the policy of the Detroit Branch for the ensuing year.

Mr. Moore, chairman of the Program Committee, promises an exceptionally good program for the coming year.

The out-of-town members present were Dr. A. B. Stevens, of California, Prof. Ruddiman, of Nashville, Tenn., and Professors Stocking and Glover, of Ann Arbor, all of whom gave short but interesting talks.

The program for the evening dealt with the U. S. P. and N. F. revision, with Prof. Scoville and Messrs. Seltzer, Webster and Hall leading the discussion.

C. B. WASHBURNE, *Secretary.*

NEBRASKA.

The Nebraska Branch of the American Pharmaceutical Association met in the library of the College of Pharmacy of the University of Nebraska, on the evening of October 26, 1920. In the absence of President A. V. Pease, Dr. R. A. Lyman presided. The following papers were read and discussed:

A brief report on the Occurrence of *Heterodera radicola* on the roots of *Atropa belladonna* growing in the experimental garden of the College of Pharmacy of the University of Nebraska, was presented. Although this parasite was present in large numbers, causing considerable disturbance in the growth of the smaller rootlets, there was apparently but slight reduction in the yield for the season. This is apparently the first report of the occurrence of this pest in belladonna grown in the United States.

Dr. Albert Schneider presented a preliminary report on The Symbions of the Tongue and the Alveoli in Health and in Pyorrhea and the Value of an Autogenous Mixed Vaccine in the Treatment of *Pyorrhea Alveolaris*. The report was based upon the microscopical examination of the mouth organisms occurring in health as well as in pyorrhea. The relation of the various organisms was discussed. The use of an autogenous mixed vaccine, consisting of the organisms which predominate in pyorrhea, showed a remarkable improvement in this pathological state. The specific directions for preparing the vaccine will be given in a later report.

The same contributor also presented a report on the ferment commonly known as "California Bees." This ferment has received renewed attention since the enforcement of the dry law and is quite extensively employed in the preparation of an alcoholic drink.

He also briefly discussed the possibilities in determining the most suitable dosage of medicaments by means of skin reaction tests, and proposed that such dosage should be proportional to that dilution which will give rise to a distinct skin reaction represented by what is commonly known as the initial erythematous flush.

Prof. J. B. Burt, of the College of Pharmacy of the University of Nebraska, presented a paper on "The type of course which should be developed to best serve the needs of the food and drug analyst." It was explained that such a course could be profitably given to students taking the full four-year course. A general outline of the preliminary educational requirements, the special courses in chemistry and the types of food which should be examined and the groups of foods that should be analyzed in the college course, and the relationship of the course in chemistry to the course in the microanalytical and bacteriological study of foods and drugs, was explained.

The next meeting of the Branch will be held in November at the time of the session of the

Nebraska State Board of Pharmacy, which is about November 13th.

ALBERT SCHNEIDER, *Secretary.*

NEW YORK.

The October 1920 meeting of the New York Branch of the American Pharmaceutical Association was called to order in the Lecture Hall of the New York College of Pharmacy Building, on Monday, October 11th, at 8.15 P. M.

Thirty members were present. The minutes of the preceding meeting were read and approved.

Membership Committee.—The following applications have been received for membership in the Parent Organization and the Local Branch: *Parent Organization:* Wm. J. Macsata, 115 West 68th St., N. Y. City; Jerry McQuade, 25 City Hall Place, N. Y. City. *Local Branch:* Harry W. Crooks, 169 Elwood Ave., Newark, N. J.; Wm. H. McNeill, 159 Main St., Paterson, N. J.

Fraternal Relations.—Dr. Lascoff had nothing to report.

Audit Committee.—Dr. Diner reported all bills paid.

Education and Legislation. — Mr. Eddy brought in a lengthy report, dwelling particularly on the legislative features of the recent N. A. R. D. committee report. The preceding report was ordered filed. A letter from a member of the Branch was read suggesting that the attention of the Internal Revenue Department be called to certain contradictory rulings made by the Department. It was moved, seconded and carried that a copy of the letter be sent to the Internal Revenue Commissioner at Washington asking for information which might clarify the subject. A letter was also to be sent to the New York Conference in order that that body might take action.

Council.—Dr. Hostmann, member of the Council, brought in a brief report which was ordered filed with the thanks of the Association.

Communications.—A communication from President McCartney was read and ordered filed. In response to a request of the New York Conference, Dr. Mayer was unanimously elected a delegate from the New York Branch, to act on the Grievance Committee. A letter from Dr. Davin was read and ordered filed. A letter from Secretary Dawson, of the State Association, and the enclosed circular, were referred to the Chairman of Committee on Education and Legislation. The Secretary read a communication from Prof. Edward Kremers in which he promised to read a paper at the next meeting of the Branch. It was moved, seconded and carried that the Secretary be empowered to make arrangements for a pre-meeting dinner in Prof. Kremer's honor.

SCIENTIFIC SECTION.

Dr. George C. Diekman, Chairman of the Committee on Progress of Pharmacy, brought in a lengthy report, reading abstracts on the following:

Silver Salvarsan.
Inorganic phosphates in glycerophosphates.
Acetic acid in acetylsalicylic acid.
Adulteration in Burrow's Solution.
Rhubarb poisoning.
Incompatibility of calomel and antipyrine.
Ammonium tetraoxalate.
Calomel from mercuric chloride.
Chlorides in potassium bromide.

This report was received and ordered filed with the thanks of the Association.

Dr. Robert P. Fischelis, Chairman of the Drug Trade Board of Public Information, the speaker of the evening, presented the following paper on:

ORGANIZED PUBLICITY FOR PHARMACY.

In the period of readjustment and reconstruction through which the world is now passing we are learning many things and, more than ever, the significance of taking and maintaining a place in the scheme of things is brought home to us, both as individuals and as members of a profession.

We have come to realize that a profession, an association, a union, an institution and an individual mean nothing in themselves. It is their contact with the world at large that makes them powerful, just as lack of such contact causes their ultimate relegation to the realm of oblivion.

As pharmacists, our common fault has been to keep the knowledge of our service to the public pretty much to ourselves. We have assumed that the public knows all about our work in general and that it is not interested in particulars. This attitude has hampered the spreading of accurate information about the practice of pharmacy and has harmed us more than any other single thing. Even the editor of a metropolitan newspaper that lives

on sensationalism would not print an untrue story concerning drug prices or other phases of pharmacy, if he knew the facts. And that is just where we have fallen down. We have failed to keep the newspaper editor and the public informed on what has been transpiring in the various branches of the pharmaceutical profession. We have not even provided correct information when it was sought. The result is natural. Only the bad, the sensational, the acts of the black sheep in the folds have been recorded in the public prints. The great contributions of pharmacy to the public welfare have been ignored. They have not been presented in the language of the newspaper, hence they have had no news value.

Leaders in the various branches of pharmacy have realized this state of affairs, but they have been slow to do anything lest it might savor of propaganda for their particular branch of work. It was not until Dr. Arny suggested a coöperative movement for pharmaceutical publicity that any progress was made to supply the long neglected public with facts. This coöperative movement is an outgrowth of the idea of federating the various national pharmaceutical associations into one great body. Finding that conflicting interests precluded a successful merger of this kind, Dr. Arny was farsighted enough to appreciate the possibilities of combined efforts of these associations along some lines in which all are equally interested. He submitted a plan for organizing a national committee composed of one representative from each of the eight national pharmaceutical associations. The final organization of this body under the name "Drug Trade Board of Public Information," is a matter of record and has been given wide publicity in the pharmaceutical press.

It is now up to the Board and largely up to its officers to demonstrate whether it is possible for pharmacy to be fairly portrayed in the public press. Our whole object will be to supply information on pharmaceutical subjects in non-technical but accurate language. If requested to do so, we will also advise as to the scientific or technical accuracy of articles to be published by newspapers and special writers.

We feel confident that there is sufficient matter of interest in the progress of pharmacy to supply a great deal of good wholesome educational reading to the public.

Dr. Fischelis then outlined the plans for organized publicity in detail, and gave examples of the type of publicity that is to be sent out by the Drug Trade Board of Public Information.

Mr. Waterbury opened the discussion of this paper with some very interesting remarks. A general discussion followed, in which Messrs. Diner, McQuade and Hostmann took part. The papers were ordered received and a vote of thanks was extended to the speakers.

The following brought in reports on State conventions held during the past season: R. R. Gerstner, on the New York State meeting, President Harry W. Crooks, of the New Jersey Pharmaceutical Association, reported on their recent meeting. Dr. Curt P. Wimmer reported on the Connecticut convention.

HUGO H. SCHAEFER,
Secretary.

PHILADELPHIA.

The first meeting of the 1920–21 season for the Philadelphia Branch of the American Pharmaceutical Association was held at the Philadelphia College of Pharmacy and Science Tuesday evening, October 12, 1920, President Goodhart presiding.

The minutes of the previous meeting were read and approved as were also the reports of the testimonial dinner given in honor of Prof. E. Fullerton Cook. Twelve new members were elected. The death of Edwin Boring, one of the oldest branch members, was reported, and the President appointed the following Committee to prepare suitable resolutions to be sent the family of the deceased: Prof. C. B. Lowe, *Chairman*, and J. W. E. Harrisson.

There being no further business the evening's program started with "An Open Forum on Deletions and Additions to the National Formulary." The Secretary read a communication from the Chairman of the National Formulary Committee, Wilbur L. Scoville, asking for the coöperation of the Local Branch in ascertaining those preparations which should be deleted and those which should be added. The tentative list submitted by the Committee was read and each one discussed. In the opinion of those present the following preparations slated for deletion have some reason for reconsideration inasmuch as they are used in some localities: Emulsion of Castor Oil; Elixir Formates; Glycerite Tragacanth; Powder Kino and Opium; Tincture Iodine, decolorized; Mixture Carminative; Mixture Pectoral; Petroxolin Iodine; Petroxolin Iodine,

Dilute; Petroxolin Guaiacol; Petroxolin, Liquid; Petroxolin Spissum; Petroxolin Methyl Salicylate. It was duly moved and passed that as not nearly all of the members were present, it would be advisable to send questionnaires to the members asking for their opinions on the list. The Secretary was directed to carry out this suggestion.

Prof. Charles H. LaWall presented "A Review on the Tests for Methyl Salicylate in Oil of Gaultheria." All the available tests were reviewed, pointing out the uncertainty of most and the unreliability of all in so far as quantitative determinations were concerned. Prof. LaWall concluded by saying that there was really little use in wasting much time on trying to locate or discover an infallible test. It developed in the discussion that it would be possible to require certain impurities to be added to all methyl salicylate manufactured and in that way determine when methyl salicylate had been added to either the pure Oil of Gaultheria or the Oil of Sweet Birch.

Dr. George R. Pancoast presented a paper on "Government Narcotic Reports." He explained why the wholesaler is so exacting in accepting narcotic orders and also commented on some of the technicalities that arise from time to time. A brief discussion followed.

J. W. E. Harrisson presented the following resolution, which was adopted and directed to be sent to all Philadelphia newspapers:

Resolved, That the Philadelphia Branch of the American Pharmaceutical Association go on record as opposing the illegal sale of intoxicating liquors by pharmacists and favoring such legislation as will deprive offending pharmacists from practicing in this State.

An advance notice of the December meeting was read.

ELMER H. HESSLER, *Secretary.*

VIRGINIA.

The regular meeting of the Virginia Branch of the American Pharmaceutical Association was held Thursday, October 21, in the State Board of Pharmacy office, Richmond. There were about thirty in attendance. The officers for the ensuing year were elected and are as follows: W. G. Crocket, President; W. F. Rudd, Councilor; and A. L. I. Winne, Secretary and Treasurer.

Several very fine talks were made by members of the State Board of Pharmacy and leading pharmacists of the State.

We hope to greatly enlarge our membership during the coming year, and we know it is only a matter of time when our local branch will be one of the strongest.

CHAS. F. WALKER,
Secretary.

COUNCIL BUSINESS

A. PH. A. COUNCIL LETTER NO. 7.
(Abstract.)

WASHINGTON, D. C., October 2, 1920.

22. *Election of the Chairman of the Publication Committee.* The following nominations for Chairman of the Publication Committee have been received: J. H. Beal, A. G. DuMez, Chas. H. LaWall, H. B. Mason. J. H. Beal, Charles H. LaWall and H. B. Mason requested that their names be withdrawn.

23. *Election of active members—Result of vote:* Nos. 84 to 152, inclusive, for active membership, were elected.

24. *Appropriation for War Veterans' Committee:* Motion to appropriate $25 to meet the expenses of the War Veterans' Committee has received a majority of affirmative votes.

25. *Application for permission to form a local branch of the A. Ph. A. at Birmingham, Ala.*

"To the Council of the American Pharmaceutical Association:

"We, the undersigned, having fulfilled the requirements for members of the American Pharmaceutical Association, and being members of this Association, or having properly made application for membership in same, do hereby petition the Council of the American Pharmaceutical Association for a local branch of this Association, to be known as the 'Birmingham Branch of the American Pharmaceutical Association.'"

Signed by the following Alabama members:

Barry O. Shiflett, Birmingham,
T. D. Wilkinson, Jr., Madison,
C. H. Latham, Huntsville,
John W. Patton, Birmingham,
Elbert W. Gibbs, Birmingham,
V. E. Krauss, Birmingham,
L. G. Morris, Birmingham,

Tim V. Chumley, Birmingham,
E. A. Herlong, Fairfield,
W. J. Pittman, Birmingham,
R. W. Fleming, Easley,
W. J. Adams, Birmingham,
David Letaw, Birmingham,
C. R. Walker, Easley,
Carl Whorton, Gadsden,
V. T. Kissell, Birmingham,
S. L. Toomer, Auburn,
R. P. Mullins, Selma,
H. B. Foster, Haleyville,
R. H. Scruggs, York.

26. *Appropriation of an additional $300 for budget item No. 2, printing, postage and stationery.* Motion by Wm. B. Day, September 23: "This appropriation has the approval of the Chairman of the Finance Committee and is seconded by J. A. Koch."

27. *Election of active members.* You are requested to vote on the following applications for active membership:

No. 153, Benjamin F. Foley, Jr., Wakefield, Va.; No. 154, Charles Lewis Pedigo, Roanoke St., Blacksburg, Va.; No. 155, Jacob Michlin, P. O. Box 209, Jerusalem, Palestine; No. 156, Milton J. Harnist, 5701 Vernon Ave., St. Louis, Mo.; No. 157, Aurel Howard Filsinger, 15 Spring Common, Youngstown, Ohio; No. 158, Walter William Ellenson, 714 Lower Ave., Superior, Wis.; No. 159, Harry A. Cohen, 178 Hazle St., Wilkes-Barre, Pa., S. & S. member; No. 160, Reuben Leventhal, 101 W. 126th St., New York, N. Y.; No. 161, Oliver W. Guilbert, Waseca, Minn., S. & S. member; No. 162, Louis Andrew Gorham, 2617 N. Monticello Ave., Chicago, Ill., S. & S. member; No. 163, Arthur Cyril Lechner, 3225 Woodland Ave., Cleveland, Ohio, S. & S. member; No. 164, Joel Virgil McComb, Cotton Plant, Ark., S. & S. member; No. 165, Harry R. Crawford, 2217 Woodstock Ave., Swissvale, Pa., S. & S. member; No. 166, Carl B. Giefer, 828 West 8th St., Superior, Wis., S. & S. member; No. 167, William Francis O'Daniel, Hunnewell, Mo., S. & S. member; No. 168, Charles W. Folkestad, Ennis, Mont.; No. 169, Abraham Wyman, 203 S. Rhode Island Ave., Atlantic City, N. J., S. & S. member; No. 170, William J. Phelan, 546 Maplewood Ave., Ambridge, Pa., S. & S. member; No. 171, Miss Edna Riley, Brookings, S. D.; No. 172, Pincus Rothberg, 45 Bellevue Ave., Summit, N. J.; No. 173, Otto P. M. Canis, 4077 Jerome Ave., Woodhaven, N. Y.; No. 174, William Starr Butterley, Plateau, Ala., S. & S. member; No. 175, Edward Porchet Walsh, Florence, S. C.; No. 176, Earl Elmo Pugh, Ocilla, Ga., S. & S. member; No. 177, Samuel F. Thompson, Guernsey, Wyoming, S. & S. member; No. 178, Wrennie Carroll Henshaw, Rosedale, Miss., S. & S. member; No. 179, William J. Phillips, Bagley, Iowa, S. & S. member; No. 180, Esla Kennedy Watkins, 220 Locust St., Carlisle, Ky., S. & S. member; No. 181, William Baron Calhoun, Livingston, Mont.; No. 182, Wallace Allan Raquet, 318 West Franklin Ave., Lansing, Mich., S. & S. member; No. 183, Charles B. Caldwell, 304 Central Ave., Hot Springs, Ark., S. & S. member; No. 184, William Daniel Thompson, Nicholls, Ga., S. & S. member; No. 185, J. Parker Harvey, 19th and Arch Sts., Philadelphia, Pa., S. & S. member; No. 186, Lawrence Karl Boehme, 46 South Main St., Germantown, Ohio, S. & S. member; No. 187, Asher Miller Hawk, 400 First Ave., Parkesburg, Pa., S. & S. member; No. 188, Alvin U. Wallen, 606 Front St., Brainerd, Minn., S. & S. member; No. 189, Frederic Kuhn Schmidt, 20 East 69th St., New York, N. Y.; No. 190, Alphonse Paul Groblewski, 241 East Maine St., Plymouth, Pa., S. & S. member; No. 191, Bert Barnet Hershenson, 98 Fairmont St., Malden, Mass., S. & S. member; No. 192, Joseph Gid Parrish, Ocala, Fla., S. & S. member; No. 193, Willie Guss Taylor, cr. Taylor Drug Co., Patterson, Ga., S. & S. member; No. 194, Leo John Miller, Post Hospital, Ft. Leavenworth, Kans., S. & S. member; No. 195, Daniel Windsor Hall, Main St., Beulah, N. D., S. & S. member; No. 196, Sereck Hall Fox, 8033 Rowland Ave., Philadelphia, Pa., S. & S. member; No. 197, Charles George Yarbrough, Monroeville, Ala., S. & S. member; No. 198, Irwin E. Lehr, 46 S. Market St., Shamokin, Pa., S. & S. member; No. 199, Gustave John Essbach, 544 S. 12th St., Newark, N. J., S. & S. member; No. 200, William E. Hendricks, 7200 Woodlawn Ave., Seattle, Wash., S. & S. member; No. 201, Henry T. Hopkins, First St., Keyport, N. J., S. & S. member; No. 202, Ellis Wesley Cookson, 438 Roosevelt Ave., N., Wichita, Kans., S. & S. member; No. 203, Albert O. Bittner, Cresbard, S. D., S. & S. member.

A. G. DuMez, *Secretary.*

A. PH. A. COUNCIL LETTER NO. 8.

(Abstract.)

WASHINGTON, D. C., October 23, 1920.

28. *Election of Chairman of the Publication Committee (See item 22)—Result of vote.* A.

G. DuMez has received a majority of affirmative votes for chairman of the Publication Committee.

29. *Application for permission to form a local branch of the A. Ph. A. at Birmingham, Ala.* Granted.

30. *Appropriation of an additional $300 for budget No. 2.* Carried.

31. *Election of active members—Result of vote.* Motion No. 27, Nos. 153 to 203, inclusive, for active membership, were elected.

32. *Nomination and election of the Local Secretary.* Mr. Geo. W. McDuff, of New Orleans, has been nominated. Mr. McDuff is Secretary of the Louisiana State Board of Pharmacy and of the Louisiana Pharmaceutical Association. He was Chairman of the Committee on Arrangements for the N. A. R. D. convention held in New Orleans in 1918.

33. *Election of active members.* You are requested to vote on the following applications for active membership:

No. 204, Walter Henry Schlack, Granite Falls, Wash., S. & S. member; No. 205, David Levine, 391 Christopher Ave., Brooklyn, N. Y., S. & S. member; No. 206, Percy L. McLain, Cor. 2nd Ave. N. & 4th St., Twin Falls, Idaho; No. 207, Edmond DeBerry Ledbetter, 126 S. Front St., Wilmington, N. C., S. & S. member; No. 208, James Fillmore Smith, 14 King Ave., Florence, S. C., S. & S. member; No. 209, Max Kitzis, 439 East 139th St., New York, N. Y.; No. 210, Ralph E. Hayes, 1104 Euclid Ave., Cleveland, Ohio; No. 211, Victor LaPiana, 769 Marshall St., Milwaukee, Wis., S. & S. member; No. 212, Maurice Siskel, 2028 S. Halsted St., Chicago, Ill., S. & S. member; No. 213, Morris Glantz, S. W. Cor. 4th and Queen St., Philadelphia, Pa., S. & S. member; No. 214, Gaston DuBois, 1724 South Second St., St. Louis, Mo.; No. 215, C. A. Geisler, 11154 Homewood Ave., Chicago, Ill.; No. 216, Frank Harman Galbraith, 207–215 E. Water St., Milwaukee, Wis.; No. 217, John Arnold Strand, 214 N. 14th St., Corvallis, Oregon, S. & S. member; No. 218, Ambrose Rea Haberstroh, 909 Fourth St., Juniata, Pa., S. & S. member; No. 219, Selmer J. Simonson, Greybull, Wyoming, S. & S. member; No. 220, George Anton Subert, 2405 S. Troy St., Chicago, Ill., S. & S. member; No. 221, Andrew F. Emberg, 275 E. 1st St., Salt Lake City, Utah, S. & S. member; No. 222, Silas C. Olson, Pablo, Mont., S. & S. member; No. 223, Charles Carter, Rail Street, Shoshone, Idaho; No. 224, T. Frederick Roediger, 149 E. 71st St., Cor. Lexington Ave., New York, N. Y.; No. 225, David Charles Moore, 135 High St., Santa Cruz, Calif., S. & S. member; No. 226, Frank H. Furman, 6015 Kingsessing Ave., Philadelphia, Pa., S. & S. member; No. 227, Lyle Bell Clothier, 304 Prospect St., Bellingham, Wash., S. & S. member; No. 228, George Abdel Sayed, The Egyptian Pharmacy, Shebin El Kom, Egypt; No. 229, Benjamin Green, 497 East 120th St., Cleveland, Ohio, S. & S. member; No. 230, Paul Joseph Mackay, 2306 E. 103rd St., Cleveland, Ohio, S. & S. member; No. 231, Ernest L. Beezley, 120 South 32d St., East, Cedar Rapids, Iowa, S. & S. member; No. 232, Aaron Mazeloff, 1007 Southern Boulevard, New York, N. Y., S. & S. member; No. 233, Robt. B. Goree, 206 B 5th St., Orange, Texas; No. 234, E. Bradford Holbrook, Donaldsonville, La.; No. 235, Albert J. Comeaux, Eden St,. Plaquemine, La.; No. 236, Harry Cohen, DeRidder, La.; No. 237, Frank E. Irvine, First St., DeRidder, La.; No. 238, Charles Heno, Napoleonville, La.; No. 239, Joseph Cecil Hearn, Forest Hills Inn, Forest Hills, L. I., N. Y.; No. 240, Olaf I. Waring, 154 11th St., Long Island City, N. Y.; No. 241, Edmond Joseph Léger, 1372 Riverside Drive, New York, N. Y.; No. 242, Frederick Raymond Morrison, 2178 E. 79th St., Cleveland, Ohio, S. & S. member; No. 243, Morris Noveck, 1334 N. 6th St., Philadelphia, Pa., S. & S. member; No. 244, Edmund C. Dickson, 63 Revere St., Portland, Maine.

A. G. DuMez, *Secretary.*

Boston, October 28, 1920.

EDITORIAL NOTES

Editor: E. G. EBERLE, Bourse Building, Philadelphia, Pa.

Committee on Publication: A. G. DUMEZ, *Chairman;* J. H. BEAL, CHARLES H. LAWALL, CASWELL A. MAYO, H. B. MASON, and the Editor-in-Chief of the JOURNAL, General Secretary, Treasurer and Reporter on the Progress of Pharmacy, *ex-officio.*

Collaborators: C. HERBERT PACKARD, President, A. Ph. A.; WILBER J. TEETERS, President, A. C. P. F., H. C. CHRISTENSEN, Secretary, N. A. B. P., E. FULLERTON COOK, Chairman, U. S. P. Revision Committee; CHARLES H. LAWALL, Chairman, Council A. Ph. A. The Chairmen of the Sections A. Ph. A.: A. G. DUMEZ, IVOR GRIFFITH, EDWARD SPEASE, CHARLES O. LEE, CURT P. WIMMER and E. F. KELLY.

DEPARTMENT OF COMMERCIAL INTERESTS.

The Australasian Journal of Pharmacy, the official federal publication of the Associated Pharmaceutical Organizations of Australia, in the August issue makes favorable editorial comment on this Department, conducted by Robert P. Fischelis, and reprints the code of ethics by Henry P. Hynson from a recent number of THIS JOURNAL. The *Journal* states that the latter subject is introduced editorially, because in six months' time the Australasian Pharmaceutical Conference will hold its long-deferred meeting. "What more suitable task," asks the editorial, "could the Conference assume than to draw up and promulgate a code of ethics for the guidance of Australian pharmacists?" In the same issue part of the article of the Department of Commercial Interests, "The Value of 'Pharmaceutical Atmosphere,'" is reprinted.

WAR DEPARTMENT SELLS REMAINING SURPLUS OF HOSPITAL BANDAGES AND ABSORBENT COTTON.

The Surplus Property Branch Office of the Quartermaster General of the Army has sold to Thompson & Kelly Co., of Boston, the remaining surplus of bandages and absorbent cotton, purchased for the use of the Army during the war. The sale netted the Government more than $1,000,000. The bandages alone represent a quantity sufficient to supply the hospitals and surgeons of the United States with all their needs for at least 18 months. The Boston firm was the highest of a number of bidders for these items. Included in the sale were a million dozen roller and between two and two and one-half million compressed bandages, and approximately 2,250,000 1-ounce packages of absorbent cotton.

ANTHRAX TRACED TO SHAVING BRUSHES.

The discovery of four cases of anthrax in Massachusetts caused Dr. Eugene R. Kelly, state commissioner of public health, to issue a warning, October 28, against the use of cheaper grades of shaving brushes. The cases were traced to brushes, the hair of which was imported from Manchuria, the commissioner stated. This recalls the recent outbreak of anthrax in Oklahoma, and also reports from other places that the disease had been carried to humans through the use of shaving brushes. Investigation showed the disease had been carried by brushes made with hair from horses that had anthrax. The daily press has reported that Surgeon-General H. C. Cummings contemplates asking Congress to pass a law preventing the manufacture of shaving brushes of horse hair.

CIVIL SERVICE EXAMINATION FOR PHARMACOLOGIST.

The United States Civil Service Commission announces an open competitive examination for pharmacologist. A vacancy in the Bureau of Internal Revenue, Treasury Department, Washington, D. C., at $2,500 to $3,000 a year, and vacancies in positions requiring similar qualifications, at these or higher or lower salaries, will be filled from this examination, unless it is found in the interest of the service to fill any vacancy by reinstatement, transfer, or promotion.

The entrance salary within the range stated will depend upon the qualifications of the appointee as shown in the examination.

Applications should be properly executed, excluding the medical certificate, and must be filed with the Civil Service Commission, Washington, D. C., with the material required, prior to November 30, 1920.

THE RED CROSS OF THE FUTURE AND THE SERVICE MAN.

The primary obligation of the American Red Cross is to the Service Man of the Army and Navy. Five duties still remain:

First, To stay with the Army of Occupation, comprising about 17,000 officers and men.

Second, To continue in the hospitals of the Army, the Navy and the Public Health Service where there are more than 26,000 men, many of whom will be retained there for months and some for years, and carry on recreational and social work.

Third, To keep in touch as an Advisory Organization with the discharged men of the Army and Navy, and be ready—not in the way of financial aid, but what is worth more—to contribute kind advice and friendly assistance.

Fourth, To carry on the work with the families of soldiers and sailors and for the community at large.

Fifth, To care for those blinded in the crash of war, a Service turned over to the Red Cross by the Government.

"Am I my Brother's Keeper?" is the stammering alibi of sordid selfishness. Answer the call of your Red Cross, which holds its Fourth Roll Call November 11–25, and fulfill your obligation to the brother who is still with Uncle Sam.

CHAULMOOGRA OIL TO BE USED BY PUBLIC HEALTH SERVICE AGAINST TUBERCULOSIS.

Refined chaulmoogra oil, which is stated by experts of the United States Public Health Service to have arrested the progress of leprosy, is soon to be used by them in their fight against tuberculosis. Experiments along this line will be conducted in treatment of patients in Hawaii. Dr. A. L. Dean, chemist and president of the University of Hawaii, and Dr. J. T. McDonald, superintending physician of the leprosy investigation station at Kalihi, Hawaii, have charge of the investigation.

POTASH IN ABUNDANCE IN BRINY LAKES OF WEST AND SOUTHWEST.

According to the reports of chemists who have investigated and tested the water and earth material of the different briny lakes and basins of the South Plains region of Texas, they contain potash in great abundance. In one basin that covers nearly six thousand acres, situated about twelve miles west of O'Donnell, the potash content is more than 12 per cent. The test holes in this basin are about 200 feet deep and the potash is found all the way down to that depth and may extend much further. It is stated that a new separation process has been adopted and placed in successful operation in two potash extracting plants at Antioch, Neb. These two plants obtain their potash from briny lakes of the same character as those in the Texas region.

GUM ACACIA FROM ARGENTINA.

Samples of gum acacia collected in the forests of Argentina have been forwarded by Trade Commissioner Smith, and are on file in the Bureau of Foreign and Domestic Commerce and the district offices. It is stated that 100 tons or more are annually available.

TECHNICAL TABLETS.

BY WILBUR L. SCOVILLE.

We like both.—Young men have been kept in full vigor and health for 16 months on a diet free from fat but with a liberal amount of fresh vegetables and fruits. Without the latter in sufficient quantity fat is necessary to preserve health.

Sterilizing the paths.—For killing weeds in walks, roadways and where no growth is desired, a solution of phenol (1 pint in 4 gallons of water) is recommended. For reducing weeds, including dandelions in grass, without injury to the grass, applications of a weak solution of ferrous sulphate are recommended. (No strength stated.)

Don't speed.—Deterioration in lead acid storage batteries is caused by too rapid or too slow charging, more than by discharging. Rapid charging causes abnormal gas evolution and the sloughing of the plates, causing a milky appearance in the electrolyte.

Obesity.—Fat plays a peculiar part in metabolism, not well understood. It seems to be something more than a calorie developer, since fat-like bodies have much to do with nerve action. Now Taylor and Nelson find that even starch grains contain fat, probably in combination with the starch.

Snap the Whip.—The separation of metals in an alloy has been partially accomplished by centrifuging the melted alloy at a rate of 9,000 revolutions per minute. Lead-and-tin and lead-tin-bismuth alloys have shown some separation under these conditions.

Naked Truth.—That the medicinal effects of sun baths is due to ozone formed by the sun's rays is denied by R. Bayeux, who finds that no ozone is formed in the upper atmosphere. The presence of ozone he thinks must be attributed to something besides light rays.

Omnia Gallia, sum gallium.—A true monochromatic light has been made by alloying cadmium with not more than 3 percent of gallium and filling a quartz tube with the vapors of this alloy. The electric arc then gives a strong cadmium spectrum, and the gallium prevents the adhering of the metals to the sides of the tube, thus maintaining the light power.

Sprinkle with soda water.—An atmosphere which is rich in carbon dioxide is very favorable to the growth and development of vegetables. Peas, beans, potatoes, radishes, lettuce, etc., all show a stimulating effect when grown in such an atmosphere.

From the South.—Oil of eucalyptus is strongly but slowly antiseptic. It acts much more slowly than phenol, but is about three times as strong. All of the different varieties of eucalyptus oil tested were germicidal, but the Australian oil was most powerful.

Inharmonious harmones.—Dr. Loeb says that there are three factors in the development of cancer. Heredity, irritation, or physical stimulation, and the influence of harmones or internal secretions. The last is probably the most important factor, and the most difficult to control.

Deceiving starch.—Formaldehyde acts upon starch in a way similar to diastase, forming dextrin and even sugar. But on prolonged digestion the action may be reversed. There is also some evidence that formaldehyde possesses proteolytic properties, similar to that of pepsin.

Liver their bacon.—Lions and tigers are said to prefer herbivorous prey, and they eat first the liver and those portions of the meat which are richest in glycogens, showing that even the most extremely carnivorous animals want some starchy food.

Useful skeletons.—Infusorial earth is used as a cleanser, polisher, non-conductor of heat, fireproofing, component, absorbent, filtering material, paper filler, ceramic filler, in fireworks, papier mache, hard rubber, and as a building material. It is prepared by roasting, grinding, then sifting—and it is usually alkaline.

Brass.—E. Rost finds that zinc and copper in minute amounts are normal constituents of the human body, but are especially abundant in workers in these metals, and users of cosmetics. They are absorbed from foods, chiefly from plant foods. Book agents take notice!

About eating.—Tondek says that a one-sided vegetable diet and too much water produces, on long continuance, a severe polyuria which is difficult to treat. The normal resistance to infection is lowered, and the phosphoric tissues are probably degenerated.

Another serum treatment.—Diabetes is being treated by the administration of a special serum which is claimed to raise the carbohydrate tolerance 25 to 60 percent. The serum is procured from rabbits after special treatment which stimulates the internal secretory glands, and forms a harmone in the blood which is useful in the treatment of diabetes.

Cheaper than pepsin.—J. Traube says that the main function of hydrochloric acid in the starch is to make the proteins swell and soften so that the pepsin can attack them. Probably this is also the chief function of acid in accelerating the action of pepsin.

About pellagra.—In a study of pellagra and its causes, the conclusion of the New York commission is that it is an infectious rather than a dietary disease. In some cases the spread of the disease was arrested by installing proper sewage systems.

The way of the wherefor.—Chaulmoogra oil contains substances which are 100 times more bactericidal than phenol, but this action is directed toward acid-fast bacteria only. This fact supplies a scientific reason for its success in treating leprosy.

PERSONAL AND NEWS ITEMS.

W. G. Ungerer, member A. Ph. A., from New York, has been presented with an engrossed certificate of service from the American Field Ambulance Service in France. The tribute is addressed to American perfumers and other friends who, in response to an appeal by Mr. Ungerer, contributed two motor-ambulances to the work of the Service. The cars were inscribed: "American Perfumers Nos. 1 and 2," and both saw much active service.

Dr. Armando J. Alacan, of Havana, visited the States on his honeymoon trip, last month. He is a graduate of the Philadelphia College of Pharmacy, and is now a member of the faculty of the Havana College of Pharmacy.

President Charles Herbert Packard, of the American Pharmaceutical Association, and Miss Elma Anabel Wyer were married October 27 at Winthrop, Mass.

Mr. and Mrs. Charles W. Holzhauer, of Newark, N. J., motored through New England last month.

Mr. and Mrs. Richard V. Mattison, of "Lock Linden," Ambler, Pa., were injured in an automobile accident, while motoring in Fairmount Park. Their car was struck by another, of which the driver seemed to have lost control. The injuries of Mrs. Mattison are serious. Dr. Mattison has about recovered from the effects of those sustained by him.

Dr. Isadore Dyer, dean of the medical school of Tulane University, also of the pharmacy school, and credited with important discoveries in the treatment of leprosy, died at his home in New Orleans, October 12, aged 55 years. He was vice-president of the American Medical Association.

J. U. Lloyd and son, **Dr. John Thomas Lloyd,** were in attendance at the Texas Eclectic Medical Association, last month. Both delivered addresses before that body.

Miss Jean Robin Wilkes has entered on her duties as assistant chemist in the Washington State Food and Drug Laboratory at the College of Pharmacy. Miss Wilkes is well qualified for this work, as she majored in the chemistry of foods and drugs, and took advanced work in these subjects under Dr. C. W. Johnson, state chemist. Miss Wilkes has had experience as laboratory assistant in drug assay and prescription courses, as well as practical experience in pharmacy.

Millicent Renshaw LaWall (Mrs. Charles H. LaWall) is director of the pharmacy laboratories of the Woman's Medical College, Philadelphia.

F. R. Eldred, Edward Kremers and **H. V. Arny** were appointed on a committee of the American Chemical Society to consider the papers and viewpoints expressed at the meeting relative to the establishment of an institute on research.

W. F. Rudd, E. R. Carter and **F. R. Eldred** were named as a committee of the A. C. S. to take up the question of narcotic control at ports of entry.

Charles E. Caspari was elected chairman of the Division of Chemistry of Medical Products, A. C. S. **W. F. Rudd** was elected vice-chairman; **Edgar R. Carter,** re-elected secretary; and **R. P. Fischelis** is a member of the executive committee.

Dean Adolph Ziefle, of the School of Pharmacy of Oregon Agricultural College, in a paper before Oregon Pharmaceutical Association urged the passage of a State Pure Drug Law. The movement received the support of the Association.

Dr. and Mrs. Edward Kremers are visiting in the Eastern States. Dr. Kremers spoke before the New York and Philadelphia A. Ph. A. branches on "Twenty-five Years of Research in a Typical American Genus of Plants."

Samuel C. Henry, secretary of the National Association of Retail Druggists, celebrated his birthday, October 7, at the Round Table of the Chicago Veteran Druggists' Association.

J. H. Beal has defined the symbolism of the characters C. V. D. A., as signifying *Charistia, Veritas, Dignitas* and *Abstinentia.* Each character was beautifully explained and applied and may well serve for explaining the doctrines and ordinances of the Round Table, and be made part of the ritual, if not all of it, of this brotherhood whose motto is "Cheers for the living, tears for the dead."

Adolph Umenhofer, member of the American Pharmaceutical Association since 1908, died at his home in Chicago, September 29, aged 47 years. He was an ex-president of the Chicago Retail Druggists' Association, Vice-President of the Illinois Pharmaceutical Association, President of the Alumni Association of the University of Illinois, School of Pharmacy, and a member of the Chicago Veteran Druggists' Association. His pharmacy is located at Halsted and Fullerton Ave. Mrs. Umenhofer, one daughter and two sons survive the deceased.

We are just advised of the death of **Fred A. June,** which occurred June 13, at his home in Jamaica Plain, Mass., from diabetes. He had been in the employ of E. R. Squibb & Sons for many years. His wife and one daughter survive the deceased. In a House letter the firm states: "Mr. June was one of the truest and staunchest men who has ever honored our field staff."

SOCIETIES AND COLLEGES.

H. P. Hynson has written the following tribute to the memory of former close associates in the American Pharmaceutical Association, who have passed on.

Another Way of Life.

Beside the stream of passing friends,
I must not linger oft nor long
Nor closely watch its rapid flow.
But I may turn aside and sing
The heart-born words of memory's song
With impulse strong, but soft and low.

It is a wise philosophy
That bids us live but in today
And hold the loves of our dear past.
The might-have-been brings naught but grief,
So I will live another way
And jest and laugh e'en to the last.

And may I realize the hope,
When I have swelled the tide of fate,
That you and they will sing of me
As one who loved them all and you
And thus my friendship justly rate
Its depth, its strength and constancy.

FORTY-SIXTH ANNUAL CONVENTION OF THE N. W. D. A.

The forty-sixth annual convention of the National Wholesale Druggists' Association was held in Cincinnati during the week of October 25. The meeting brought together about 600 representatives of the wholesale drug trade, and is said to have been not only one of the largest but the most important in the history of this association.

The proceedings of the Association are of interest to all branches of the drug trade because wholesaler links the producer to the retailer. The reports on legislation, insurance, selling methods, etc., are always carefully prepared and contain useful information and valuable statistics. The members give close attention to the affairs of their business and this marks the transaction at the annual gatherings. Optimism was evident, and the administration of President Robert H. Bradley was pronounced very successful. The officers for the ensuing year are:

President, L. D. Sale, Los Angeles, Calif.

First Vice-President, Alfred Vogeler, Cincinnati, O.

Second Vice-President, John W. Durr, Montgomery, Ala.

Third Vice-President, Frank Junkermann, Cedar Rapids, Iowa.

Fourth Vice-President, H. L. Waterbury, Troy, N. Y.

Fifth Vice-President, H. S. Weller, Omaha, Neb.

Members of the Board of Control, W. J. Mooney, Indianapolis, Ind.; L. M. Smith, St. Joseph, Mo.; H. H. Robinson, Baltimore, Md., and C. F. Michaels, San Francisco, Calif.

The Board of Control, with the approval of the president, appointed F. E. Holliday, New York, secretary; C. H. Waterbury, New York, assistant secretary; Title Guarantee & Trust Co., New York, treasurer.

THE DUES OF THE AMERICAN CHEMICAL SOCIETY INCREASED.

The following is taken from the editorial report in the *Journal of Industrial and Engineering Chemistry* for October, p. 938. Nearly all related organizations are confronted with somewhat similar conditions. The new fees have been made effective for the coming year, pursuant to the action at the Chicago meeting in September.

"The report of the Finance Committee made clear the fact that the Society was facing a deficit of from twenty to thirty thousand dollars this year. The main cause of this unfortunate situation was the constantly increasing cost of paper and printing. Conditions indicated that for the same reasons this deficit would be even greater during the ensuing year. The testimony of many of the councilors connected with large laboratories showed clearly that the younger men, just graduating from college and entering upon an earning career, were to-day receiving salaries which averaged at least ninety per cent more than the same type of young chemists received five years ago. Therefore an increase of dues to $15.00 would not tax the income of the young chemist of to-day as much as did the $10.00 dues of five years ago. It was recognized that the Society was indulging in no unnecessary expenditures at the present time; a curtailment of the splendid activities of the organization would therefore be necessary if the dues were not raised. The Council thereupon, with only three dissenting votes, adopted the amendment increasing the dues to $15.00, effective January 1, 1921."

RESOLUTIONS ADOPTED AT THE LAST ANNUAL CONVENTION OF THE NATIONAL ASSOCIATION OF RETAIL DRUGGISTS.

1. *Resolved*, That an appeal be made to Congress for the repeal of the present taxes imposed upon soda water and toilet articles, inasmuch as recent reports issued by the Treasury Department of the United States show conclusively that some of the taxes now levied by the Government may be withdrawn without endangering the public finances.

2. WHEREAS, steps have been taken by certain individuals and organizations to petition Congress to substitute a merchandise sales tax for the luxury excess profits and similar taxes, and

WHEREAS, the proponents of such legislation are openly advocating the application of this form of taxation to merchandise sold at retail only, we place ourselves squarely on record as opposed to the adoption of any form of tax upon business which is not uniformly and equitably applied to manufacturers, wholesalers and all dealers in every line of business.

3. *Resolved*, That the Commissioner of Internal Revenue be requested to modify Section 110 of Regulations 35 by the elimination of the requirement that the signature and address of the person to whom a narcotic prescription is delivered must appear on the back of the prescription.

4. *Resolved*, That, as the only legal way liquor can be dispensed at retail is upon the prescription of a duly licensed physician, and for medicinal purposes only, we earnestly and vigorously protest against the continued classification of retail druggists as retail liquor dealers.

5. *Resolved*, That as the eighteen official preparations classified as intoxicating liquor in Regulations 60 are used solely in the compounding of physicians' prescriptions we emphatically protest against the classification of these eighteen official preparations as intoxicating liquor, particularly as the department has ruled that these preparations will not be defined as intoxicating liquor under the new regulations regarding advertising and soliciting of orders, and call upon the Commissioner of Internal Revenue to amend Regulations 60 by striking these eighteen official preparations from the list of intoxicating liquors.

6. *Resolved*, That we protest against the classification of any official preparation as an intoxicating liquor.

7. *Resolved*, That the charges of profiteering by the drug trade are unfounded, and we protest against the publication of such statements, and we call upon all officials of the government and representatives of the public press to ascertain the facts in all such cases before making such public statements reflecting upon the drug trade.

8. *Resolved*, That as alcoholic liquors were omitted from the latest U. S. Pharmacopoeia, and such liquors may be dispensed only by druggists, and upon physicians' prescriptions, and as such liquors at the present time have no standard prescribed, we petition the present revision committee to again establish standards for such liquors.

9. *Resolved*, That the Commissioner of Internal Revenue and the Federal Prohibition Commissioner be urged to modify existing regulations governing the enforcement of the Harrison and Volstead laws in such manner as to cause them to conform with the letter and spirit of both of these laws, as many of the present regulations are unnecessarily burdensome and restrictive.

10. *Resolved*, That we continue our efforts to prevent the enactment of all compulsory health insurance laws by the several States or by Congress.

11. *Resolved*, That we continue our efforts to secure the passage of a law legalizing the establishing and maintaining of fixed resale prices by manufacturers for their products.

12. *Resolved*, That we conduct a propaganda similar to that carried on by the C. R. D. A. to induce young men attending high school to work part time in drug stores and receive therefor certain advantages by the boards of education for such work, and in this way relieve to some extent the present acute shortage of intelligent help.

13. *Resolved*, That it would be far more reasonable and just to tax a well man for his food when he is earning his wages than tax the sick and suffering when helpless and without income, and whereas Canada recently repealed the stamp tax on proprietary medicines, although Canada has a relatively larger public debt than the United States, as the result of the World War, therefore we earnestly urge Congress to repeal the tax on proprietary medicines, *and further be it*

Resolved, That a copy of this resolution be forwarded to the chairman of the Ways and

Means Committee of the House, and to the chairman of the Finance Committee of the Senate.

14. *Resolved*, That the executive committee be requested to initiate and maintain an active campaign in behalf of the pharmacist member, on all boards of health—however constituted—and whether municipal, State or federal.

15. *Resolved*, That the N. A. R. D. heartily commend the recent establishment of a pharmacy division in the National Museum at Washington.

16. *Resolved*, That we endorse the work of the American Metric Association, and aid in every possible way the final adoption of the metric system.

MAINE PHARMACEUTICAL ASSOCIATION.

Senator Frederick Hale addressed the members of the Maine Pharmaceutical Association at the regular annual meeting of that body held at Portland and Prout's Neck, September 1 to 3.

The association went on record as favoring the placing of a limit of two terms of three years each on members of the board of pharmacy.

The new officers are: President, Simon L. White, of Houlton; Vice-Presidents, George W. Rankin, of Portland, E. W. Moore, of Bingham, and H. L. Adler, of Lewiston; Secretary, M. L. Porter, of Danforth; and Treasurer, L. W. Bucknam, of Skowhegan.

Counting from the organization of the association in 1867, this is its fifty-fourth year; counting from the reorganization of the body in 1890, it is its thirtieth. Dr. M. L. Porter has been secretary of the association since 1896, so that he has now entered upon his twenty-fifth term in that office.

THE VIEWPOINT OF THE FEDERAL BOARD FOR VOCATIONAL TRAINING ANENT PHARMACY.

A bulletin of the Federal Board for Vocational Training has the following to say relative to pharmacy:

"Broadly speaking, pharmacy to be followed as a vocation is divided into the manufacturing and the retail branch. American pharmacy in its manufacturing branch has advanced to a very high state, and is the equal of any in the world. There is a splendid field and opportunity for the technically trained man in the pharmaceutical laboratory. Retail pharmacy for the man professionally inclined now shows signs of rapid advancement and improvement. There is an ever-increasing higher standard; the educational institutions in pharmacy have for years been striving to attract the qualified student, and to bring it upon a higher plane professionally. The efforts are commencing to show splendid results, and it is now but a question of time until American retail pharmacy will be the equal in standing to that of any other country. In practical life retail pharmacy to-day is the corner drug store. It has its distinct business and professional features. During the past quarter of a century or more retail pharmacy has shown marked development on its business side to the detriment of its professional side, but now there is a noticeable trend in the other direction. A successful retail pharmacist should combine good commercial training with a thorough technical training, and the promise of greatest success for the future is with the man who has a well-grounded technical and scientific training. * * *

"Any properly qualified man in retail pharmacy who is without any means may hope after an employment period of from five to ten years to accumulate from his earnings sufficient to engage in business on his own account. Retail pharmacy does not promise all the riches in the world, but it does promise a fair living income, to provide for one's self and family; it promises a helpful and useful occupation; a fair social standing, and a professional standing which is likely to rise to a much higher plane."

THE FAIRCHILD SCHOLARSHIP.

The following announcements are made in the College bulletins relative to the Fairchild Scholarship. In both instances further information is obtainable from the deans. The two together offer quite complete information and, hence, both are published. The first is taken from that of Kansas University and the other from that of the University of Minnesota.

"This scholarship of $300 is offered annually by Mr. Samuel W. Fairchild, of New York City, to further research in pharmacy. It is awarded on the basis of a competitive examination to candidates who are high-school graduates and who have successfully finished their first years work in a school or college of pharmacy or department of pharmacy of a

university, member of the American Conference of Pharmaceutical Faculties. Each school, college or department of pharmacy is limited to two candidates."

"Mr. Samuel W. Fairchild offers a scholarship in the sum of $300 to be awarded to that graduate student in any of the colleges holding membership in the American Conference of Pharmaceutical Faculties who has had two years of drug-store experience, is a high-school graduate, and who passes the best competitive examination to be conducted by or under the auspices of a committee made up of members appointed jointly by the American Pharmaceutical Association, the American Conference of Pharmaceutical Faculties, and the National Association of Boards of Pharmacy."

MONTANA BRANCH, A. PH. A.

Prof. C. E. Mollet, of University of Montana, writes that preparations are being made for some interesting Branch meetings during the winter. He also reports that the following students of the School of Pharmacy were awarded membership in the American Pharmaceutical Association: S. M. Harschfeld Butte, for proficiency in manufacturing pharmacy; Stanley W. Curtis, for pharmacognosy; C. W. Folkestad Ennis, for commercial pharmacy. The prizes were offered by F. J. Zuck, C. E. Mollet and Alex F. Peterson.

HIGHER REQUIREMENTS IN SOUTH DAKOTA.

The State Board of Pharmacy and State Pharmaceutical Association are both advocating a law requiring at least two years of collegiate work of all applicants for registration.

The law now requires nothing beyond high school training, with the usual experience.

The school of pharmacy at State College has capacity classes this year.

PHILADELPHIA COLLEGE OF PHARMACY AND SCIENCE BEGINS AN ADVANCED COURSE IN COMMERCIAL TRAINING.

A course in advanced commercial training for retail pharmacists has been opened by the Philadelphia College of Pharmacy and Science. Robert P. Fischelis teaches Advertising and Selling; C. A. Wesp, director of the School of Commerce, Accounts and Finance, Central Y. M. C. A. has charge of Accounting, and Howard Kirk, a Philadelphia lawyer, lectures on the laws involving contracts, real estate, banking, etc.

CLEVELAND SCHOOL OF PHARMACY NOW ON WESTERN RESERVE UNIVERSITY CAMPUS.

The Cleveland School of Pharmacy has been moved on the campus grounds of Western Reserve University, and the school is now officially attached to the latter, having been taken over in 1919.

THE NORTH CAROLINA PHARMACEUTICAL ASSOCIATION, BUREAU OF EMPLOYMENT.

Secretary J. G. Beard of the North Carolina Pharmaceutical Association advises that a Bureau of Employment has been opened for the purpose of serving employer and employee. The office is located in Chapel Hill, and the purpose is to serve the interests of the drug business in North Carolina.

DISTRICT OF COLUMBIA PHARMACEUTICAL ASSOCIATION.

A resolution stating that the Government has made an error in assigning the dispensing of liquor to drug stores and urging the establishment of Government dispensaries, was considered by the District of Columbia Association, October 14. Action on the resolution was deferred until their next meeting.

Frank T. Stone was elected president of the association for the coming year. The other officers are: H. W. Kenner and Charles E. Gross, Vice-Presidents; Charles J. Fuhrman, Secretary, and W. H. Bradbury, Treasurer.

THE PHARMACIST AND THE LAW.

REORGANIZATION OF THE PROHIBITION ENFORCEMENT BUREAU.

The Prohibition Enforcement Bureau is to be reorganized, Commissioner Kramer announces, to afford closer scrutiny of applications to withdraw liquors from bonded warehouses. The commissioner stated that the change was necessary, owing to the increase in the work. Two new divisions were created supplanting that which formerly examined applications. One will pass upon applications for the manufacture of alcoholic products,

determine all non-beverage uses of intoxicating liquor, fix the standards for manufactured articles containing alcohol and conduct trade investigations to determine whether articles permitted to be manufactured are produced in accordance with the law. The other division will have supervision of the construction and operation of industrial alcohol and denaturing plants.

It is planned also that the division having charge of industrial alcohol will devote some time to the development of uses for denatured alcohol by laboratory and research work. Its functions also include the analysis of many manufactured articles which contain alcohol to determine whether they comply with the regulations.

SO-CALLED MEDICINES SAID TO BE DISPENSED AT SOFT DRINK STANDS.

Prohibition enforcement officers of the Maryland district are advocating the enactment by Congress of legislation to check the unrestricted sale of so-called medicines at soft drink stands and former saloons. The officers maintain that many of these so-called medicines and other decoctions contain a high percentage of alcohol, and that they are being used in the place of intoxicants. One of these officers, District Supervisor Stone, declared the fundamental need was to prevent the sale of medicines in soft drink stands, where they could be passed over the bar by the glass as beverages, bringing the dry law into contempt.

ABSTRACT OF REQUIREMENTS WHICH RETAIL DRUGGISTS MUST OBSERVE IN DISPENSING NARCOTICS AND ALCOHOLICS.

The Kings County (New York) Pharmaceutical Society has compiled the following comprehensive list of rules that apply to the dispensing of narcotics and alcoholics. The tabulation is in convenient form for reference. Dates herein refer to year 1920, unless otherwise indicated.

NARCOTICS.

No. 1. If a retail druggist sells narcotics to physicians or dentists in broken packages he becomes a Manufacturer and must register as such and pay the manufacturers' fee of $24.00 per year.

The druggist may, however, upon presentation of an official order blank, sell a solution of narcotic in an amount not to exceed one fluidounce to a physician or dentist for use in their office practice.

No. 2. If a druggist sells on official order blanks in original or unbroken packages he must take out a license as a wholesaler and pay a fee of $12.00.

An occasional sale of an original stamped package by one retailer to another may be made without the necessity of a wholesaler's license.

No. 3. If he sells on prescription only and in broken packages he takes out a license as a retailer and pays the fee of $6.00 per year.

No. 4. The partial filling of a prescription is not permitted under any circumstances.

No. 5. Prescriptions by telephone cannot be filled.

No. 6. Each narcotic prescription must show on the back thereof the signature and address of the person to whom the medicine is delivered.

No. 7. The label must show the name and registry number of the pharmacist, the serial number of the prescription, the name and address of the patient, and the name, address and registry number of the physician who wrote the prescription.

No. 8. Druggists must register in Class 5 as dealers in exempted preparations and in ordering such preparations must give their registry number.

No. 9. They must keep a record of all such preparations purchased and sold.

The record of those sold must give the quantity, date, name and address of the PURCHASER, signed by same.

LIQUORS.

No. 1. Pharmacists should keep a record of the amount of the eighteen official preparations designated as liquors by the Internal Revenue Department that they manufacture or purchase and the disposition of the same.

No. 2. The label on each preparation should show the quantity, name of manufacturer and date made or received.

No. 3. A retail Liquor Dealers' License is not necessary in order to dispense these preparations on prescription but they cannot be sold without a prescription.

No. 4. All prescriptions for "liquors" must be written on official prescription blanks, which is form 1403.

No. 5. It is illegal for a pharmacist to compound a prescription for "liquors" written on any other prescription blank except in

emergency cases and those must be scrutinized carefully.

No. 6. All prescriptions for "liquors" when filled must be marked "cancelled" over the signature of the pharmacist, the date of filling also must be written and the prescription must be kept on separate file and full report of the prescriptions compounded the preceding month made before the 10th of each month on form provided by the Department.

No. 7. This report must show name and quantity of the liquor, name and address of the patient and name and address of the physician and total amount delivered to each patient.

No. 8. The report must also show all "liquors" purchased and the disposition made of them.

No. 9. Reports must be made to Federal Prohibition Director.

No. 10. Prescriptions for liquors must be compounded but once and must not be for a quantity exceeding one pint for any one person in a period of ten days.

No. 11. Physicians who are not specially registered to prescribe cannot write a prescription for "liquor" and a pharmacist should not compound prescriptions written by physicians that are not registered.

No. 12. Toilet articles such as bay rum, hair tonics, etc., must be sufficiently medicated to render them unfit for beverage purposes. A recent decision of Prohibition Commissioner Kramer adds to the list of permissible denaturants for bay rum, the addition of the soluble matter of not less than two grammes of the pulp of Colocynth fruit (*Citrillus Colocynthis*) to each fluidounce of the preparation.

No. 13. The Internal Revenue Department has approved the following medicating or modifying agents:

1. Tartar emetic 4 grains to one pint.
2. Quinine alkaloid or salt 2 grains to each ounce.
3. Resorcin or Salicylic acid 5 grains to each ounce.
4. Cinchonidine 2 grains to each ounce.
5. Sodium Salicylate 5 grains to each fluidounce.

No. 14. All such preparations must be labeled for external use only.

No. 15. Any of these preparations in stock when the law went into effect should now bear a label "For External Use Only" and one stating that they were in stock when the law went into effect.

No. 16. Denatured alcohol labels must contain under the skull and bones symbol the word "Poison" in large letters and the following statement:

"Completely denatured alcohol is a violent poison. It cannot be applied externally to human or animal tissue without serious injurious results. It cannot be taken internally without inducing blindness and general physical decay, ultimately resulting in death."

N. B. This applies to "denatured" and not to "medicated" alcohol.

KEEP RECORDS FOR MONTHLY ALCOHOL REPORT.

No. 17. Prohibition Mimeograph Regulation 45 has been variously construed. Many thought that it required monthly reports by users of alcohol in manufacturing and compounding beginning with April 1920, so as to cover the month of March preceding. The Internal Revenue Bureau, however, states that the first monthly report is required on or before May 5th next, covering the month of April 1920. Form 1421 must be used by all persons who hold permits on Form 1405 and Form 737. It will be necessary to keep records of users of alcohol during the month of April and every succeeding month to be able to render the reports required by the Department.

MEDICINAL PREPARATIONS.

No. 18. On Form 1421 must be stated the quantity of alcohol used, the wine or proof gallons, in manufacturing or compounding alcoholic medicinal preparations unfit for beverage use, and the quantity of liquor other than alcohol if used for such purposes, in wine gallons. On the same form must also be stated the quantity of alcohol, in wine or proof gallons, used in manufacturing or compounding alcoholic medicinal preparations fit for beverage purposes, in wine gallons. The permit holder must certify that he is the lawful holder of a permit, giving its serial number, and that he used the quantities of alcohol and other liquor in manufacturing and compounding the articles enumerated in his report in accordance with the terms of his permit and the National Prohibition Act and the regulations for its enforcement.

Alcohol used in making medicated alcohol should be recorded under Antiseptic Solutions, etc.

BARBERS' SUPPLIES, PERFUMERY, ETC.

No. 19. On form 1421 must be reported monthly the quantity of alcohol, in wine or proof gallons, used in manufacturing or compounding antiseptic solutions, toilet preparations and perfumes unfit for beverage use, and the quantity of liquor other than alcohol used for such purposes in wine gallons. It should be remembered that in making applications for permits to use alcohol in manufacturing barbers' supplies, perfumery or other toilet preparations, the rule is such that each preparation must contain not less than one ounce of essential oil to the gallon. Applications for permits are being held up by the Department because they fail to give percentage of essential oils, or show that less is used than is required.

OTHER ALCOHOL REPORTS.

No. 21. On form 1421 monthly reports must also be made giving the quantity of tax paid alcohol consumed in laboratory, manufacturing and technical use. The instructions to prohibition and revenue officers are furnished on form 1421 and should be read by all non-beverage alcohol permit holders.

No. 22. Failure to make the above reports will result in the revocation of permits.

No. 23. The reports must be made in triplicate: one copy to be retained by the permit holder and the other two copies forwarded to the State Prohibition Director.

MEDICATED ALCOHOL.

No. 24. The following formulas are prescribed for the preparation of Medicated Alcohol, which may be sold in quantities not exceeding one pint with a poison label. (The Conference, at its meeting of March 23d, voted to recommend the adoption of Formula No. 5 to the members of the affiliated organizations.)

1. Bichloride of mercury, 1 part; alcohol, 2,000 parts.

2. Bichloride of mercury, 0.8 Gm.; hydrochloric acid, 60 Cc.; alcohol, 64 Cc., water, 300 Cc.

No. 3. Bichloride of mercury, 1 1/2 grains, hydrochloric acid, 2 fluidrachms, alcohol, 4 fluidounces.

4. Formaldehyde, 2 parts, glycerin, 2 parts, alcohol, 96 parts.

5. Carbolic acid, 1 drachm; tannic acid, 1 drachm; alcohol, 1 pt.; water, 1 pint.

6. Alum, 1/2 ounce, formaldehyde, 2 fluidrachms, camphor 1 ounce, alcohol and water, each 1 pint.

7. Liquor Cresolis Comp. (U. S. P.) 10 Cc., alcohol 1,000 Cc.

No. 25. Pharmacists are limited to 100 gallons of distilled spirits (including non-beverage alcohol) in any 90 days. If larger quantities are required, a special permit must be secured.

No. 26. Physicians can secure but 100 official prescription blanks in a period of ninety days, except by special request. T. D. 3023. All prescriptions for liquor and narcotics must be written in ink.

No. 27. Regulation No. 80 provides that the head of each Ecclesiastical jurisdiction must approve all applications for sacramental wines made by ministers, priests, etc.

No. 28. T. D. 3020 gives the retail druggist when applying for renewal of his registration, under the Harrison Act, the privilege of filing an inventory taken at any date between January 1st and July 1st. Your application must positively be filed before July 1st, or a penalty will be imposed. Your inventory must include all Narcotics except those that are exempt under Section 6. Retail druggists must register under Class 3 and Class 5. Applications must be made on form 678. These must be signed by the applicant and acknowledged before two witnesses. Separate applications must be made for each class under which registration is desired. A druggist who does not register before July 1st does not have legal possession of Narcotics and is subject to severe penalty. The inventory must be on form 713 and in duplicate. The original should be placed upon file and the duplicate mailed with the application for registration. Both these must be sworn to.

RECORDS REQUIRED OF RETAIL DRUGGISTS FILLING PRESCRIPTIONS FOR INTOXICATING LIQUOR.

Regulations No. 60 have been amended in some particulars relating to the records that must be kept by pharmacists and physicians who dispense or prescribe intoxicating liquor. The amended regulations are incorporated in T. D. 3069. The abstract of requirements which follow should be corrected in accordance with T. D. 3069.

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